

MAKING INFRASTRUCTURE INTELLIGENT: IRRIGATION MODERNIZATION IN CALIFORNIA

A photograph of two people, a man and a woman, standing outdoors at what appears to be an irrigation facility. The man, on the left, is wearing a blue and white plaid shirt, blue jeans, a green hard hat, and glasses. He is holding a blue tablet. The woman, on the right, is wearing a red floral shirt and blue jeans. They are both looking at the tablet. In the background, there is a large white cylindrical tank, a chain-link fence, and a blue horizontal pipe with several vertical pipes and valves. The sky is blue with scattered white clouds.

Jeff Shaw, P.E, LEED AP
Project Manager, Senior Water Resources Engineer
PNWS-AWWA Conference
May 6, 2016

Why Irrigation Modernization?

Common Water Management Issues

Drought Resiliency and Reliability	Water Conservation	Energy Use
Crop Yields	Groundwater Management (Quantity and Quality)	Water Quality
Environmental Stream Flows	Flexibility (Frequency, Duration, Capacity)	Maximize Beneficial Use of Water Resources
Regulations	Air Quality	Replacement of Aging Infrastructure
Production Inputs	Delivery Measurement	Level of Service and District Operations
Protection of Water Rights	Sustainability	Equity

Presentation Outline

- 1. Key Questions**
- 2. Project Roadmap**
- 3. Irrigation Modernization Opportunity Assessment**
- 4. Project Example**

Key Questions

Key Questions:

1. **What opportunities are available to improve water management?**
2. **How much are irrigation modernization project(s) going to cost?**
3. **Is the project feasible? (technical, economic, financial, environmental, political)**
4. **What is the prioritization schedule for project(s)?**

Project Roadmap

A large blue pipe is being installed in a trench. The pipe is supported by metal brackets and is surrounded by dirt. The background shows a dry, hilly landscape with sparse trees.

PHASE 1:

Assess the District's potential for irrigation modernization by evaluating the regulatory, political, technical, economic, financial, and environmental feasibility and develop a general layout of the Irrigation Modernization Project

Project Roadmap

The background of the slide is a photograph of a utility room. It shows a white electrical meter and a blue gas control valve mounted on a light-colored wall. Below the wall, there is a bed of dark gravel. The overall scene is somewhat dimly lit, with the text overlaid in a semi-transparent manner.

PHASE 2:

Refine and further define the proposed general layout of the Project elements and facilities. These efforts include a Pre-Design Report and a 30% design of the Proposed Project. Phase 2 includes the Environmental Impact Report.

Project Roadmap

PHASE 3:

Design the Project and solicit and acquire contractor bids. This phase includes production and submittal of 75%, 90% and Final Plans, Specifications, Engineer's Opinion of Probable Costs, and support throughout the bidding process.

Project Roadmap

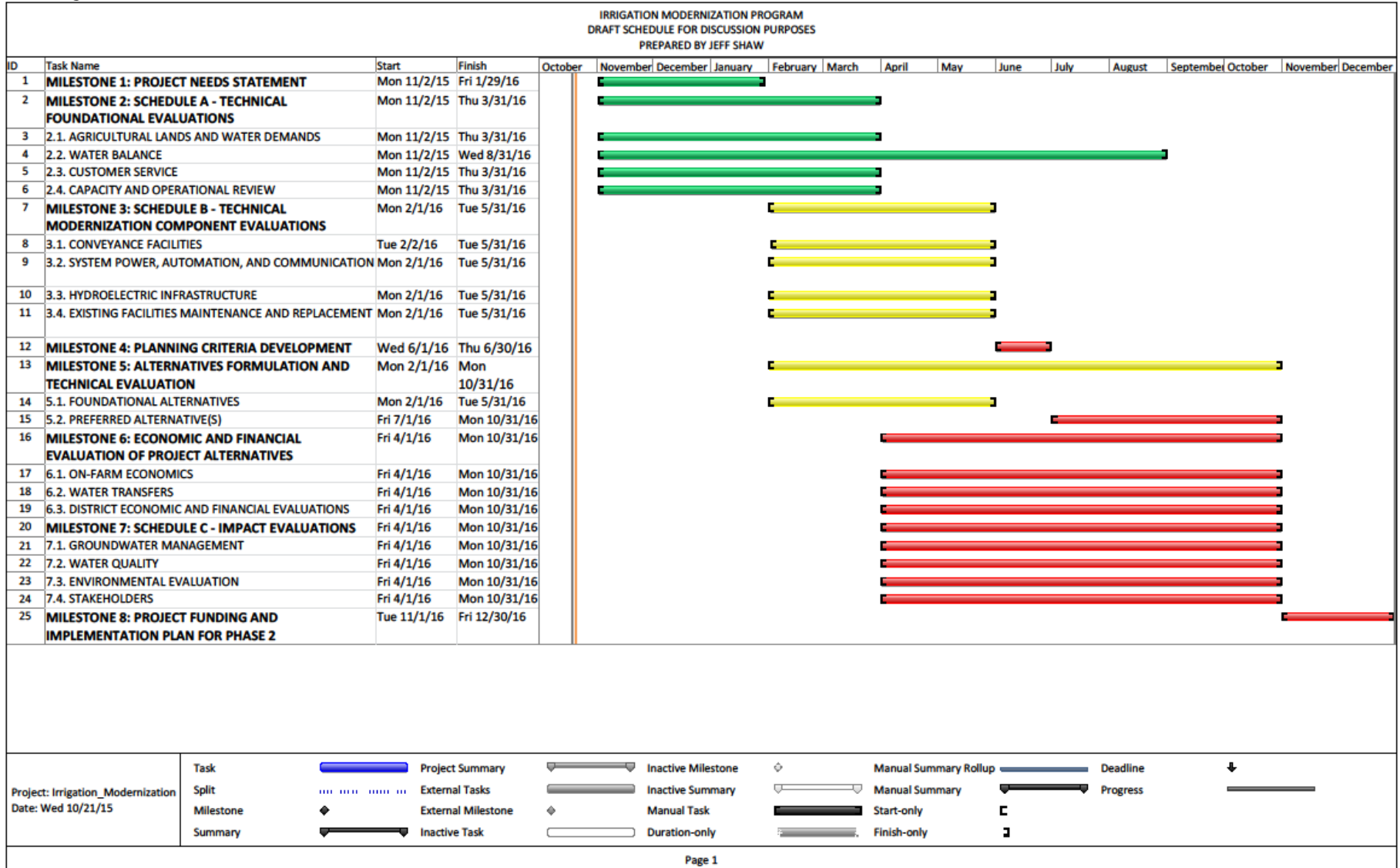
PHASE 4:

Construction management, inspection services, and engineering services during construction.



Project Roadmap

Phase 1 Feasibility Assessment Approach: Project Kickoff: Initial Opportunity Assessment



Irrigation Modernization Opportunity Assessment

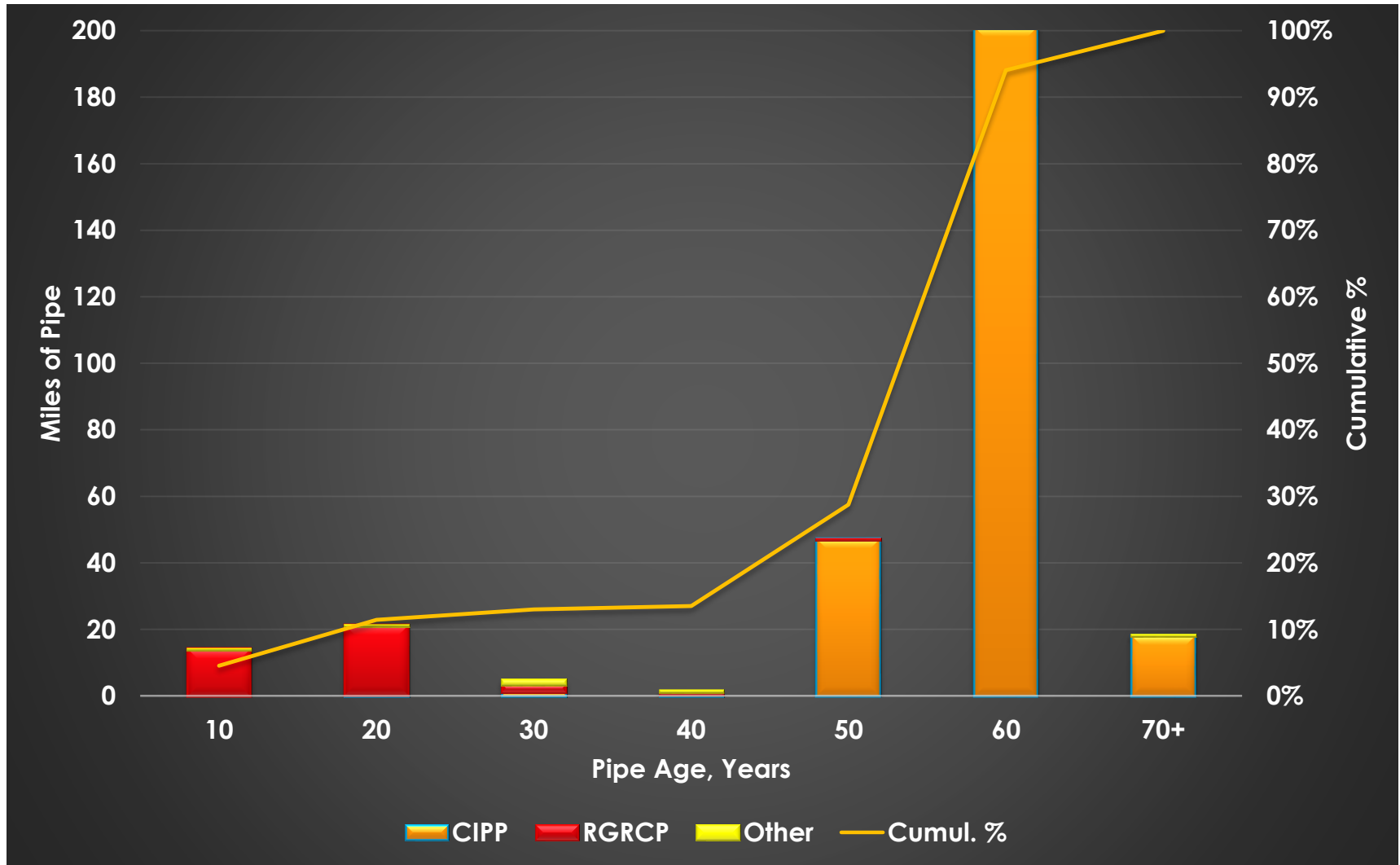
Work Plan:

1. Review Existing Infrastructure
2. Service Area and Water Demands
3. Water Balance
4. Hydrogeology
5. Customer Service, Capacity, Operational Review
6. Alternatives Development
7. Performance Indicators and Potential Benefits

Deliverable: Modernization Potential Technical Memorandum

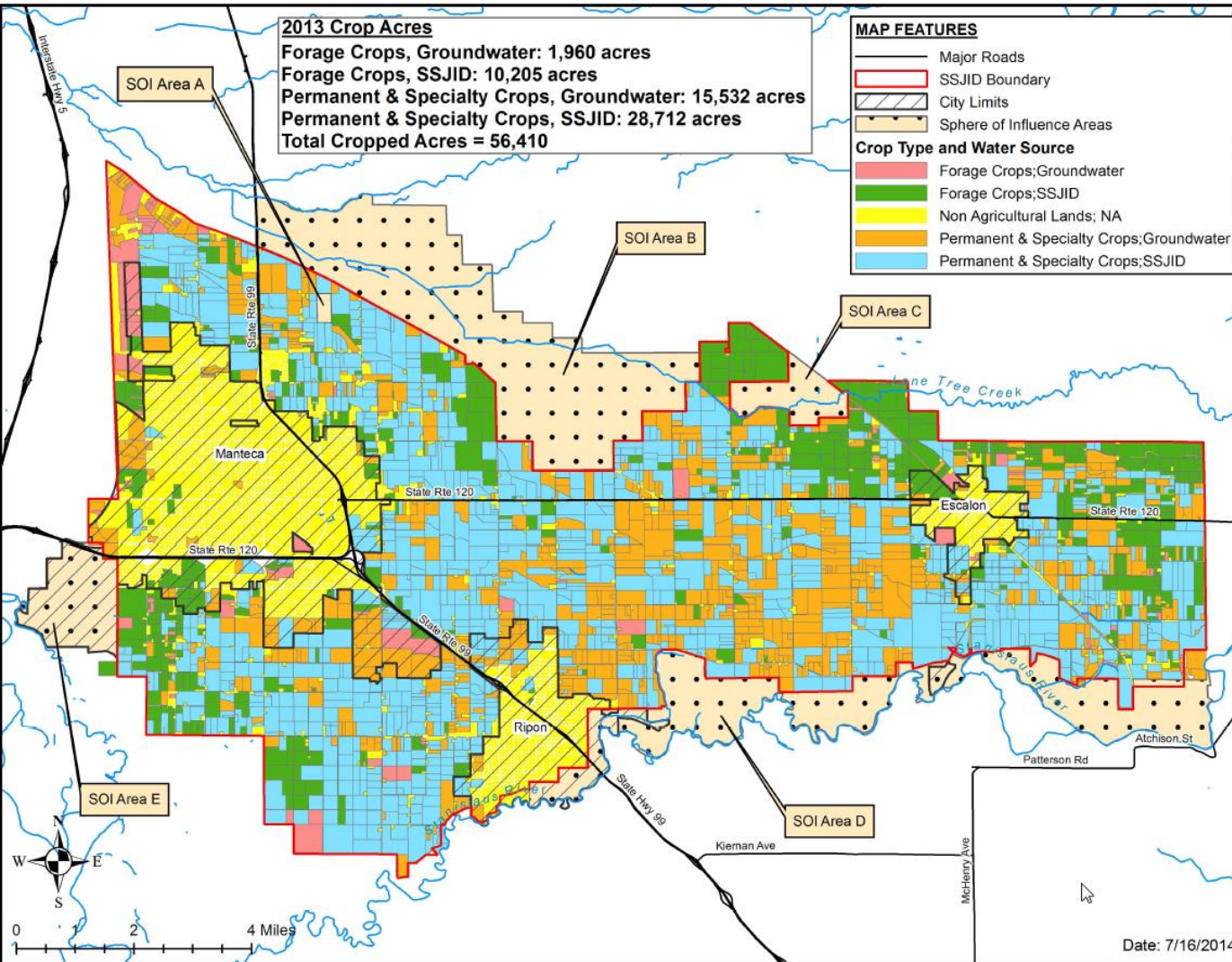
Irrigation Modernization Opportunity Assessment

1. Review Existing Infrastructure



Irrigation Modernization Opportunity Assessment

2. Service Area and Water Demands



SSJID Demands (no annexations) - 47,526 acres

Scenario	Existing Crop Trends	All Pressure
Peak Month, cfs	611	552
Total Volume, AF	162,985	154,059
Allotment Not Used*, AF	64,625	73,551

Annexed SOI Area Demands - 8,394 acres

Scenario	Existing Crop Trends	All Pressure
Peak Month, cfs	113	98
Total Volume, AF	29,302	26,957

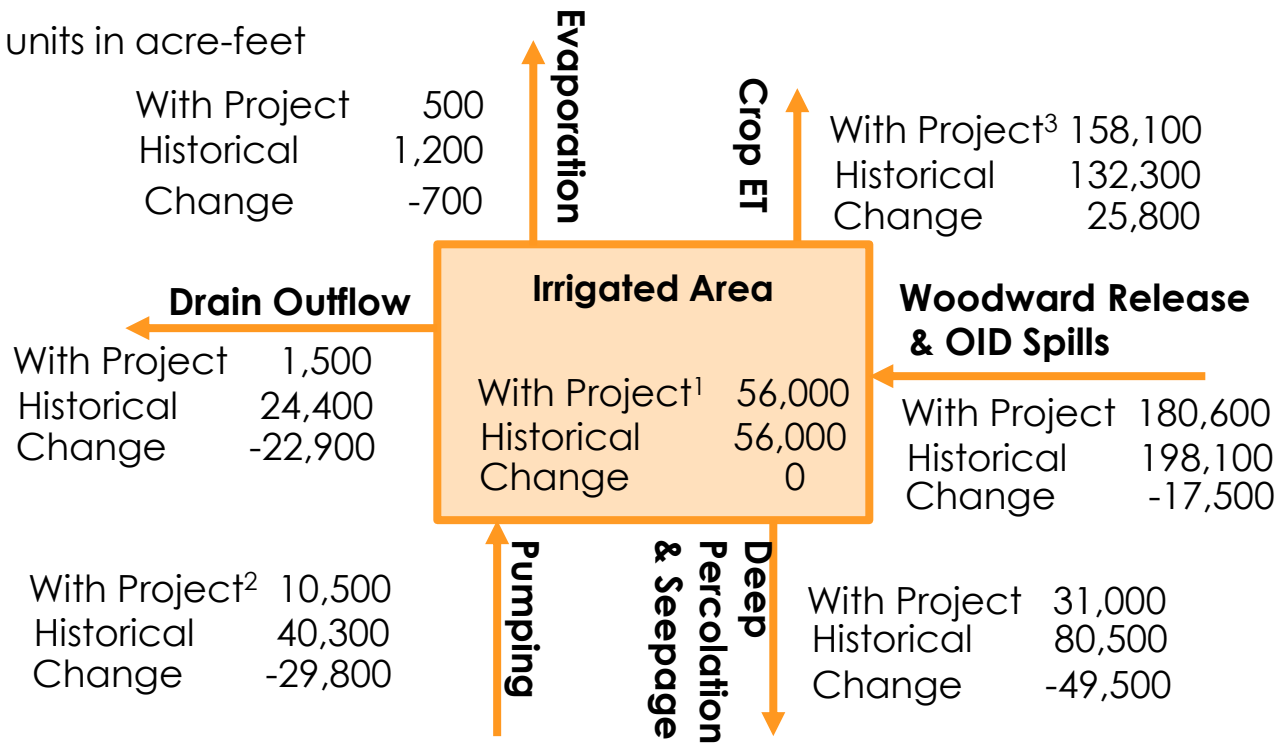
Total Demands - 55,920 acres

Scenario	Existing Crop Trends	All Pressure
Peak Month, cfs	723	650
Total Volume, AF	192,286	181,016
Allotment Not Used*, AF	35,324	46,594

Irrigation Modernization Opportunity Assessment

3. Water Balance

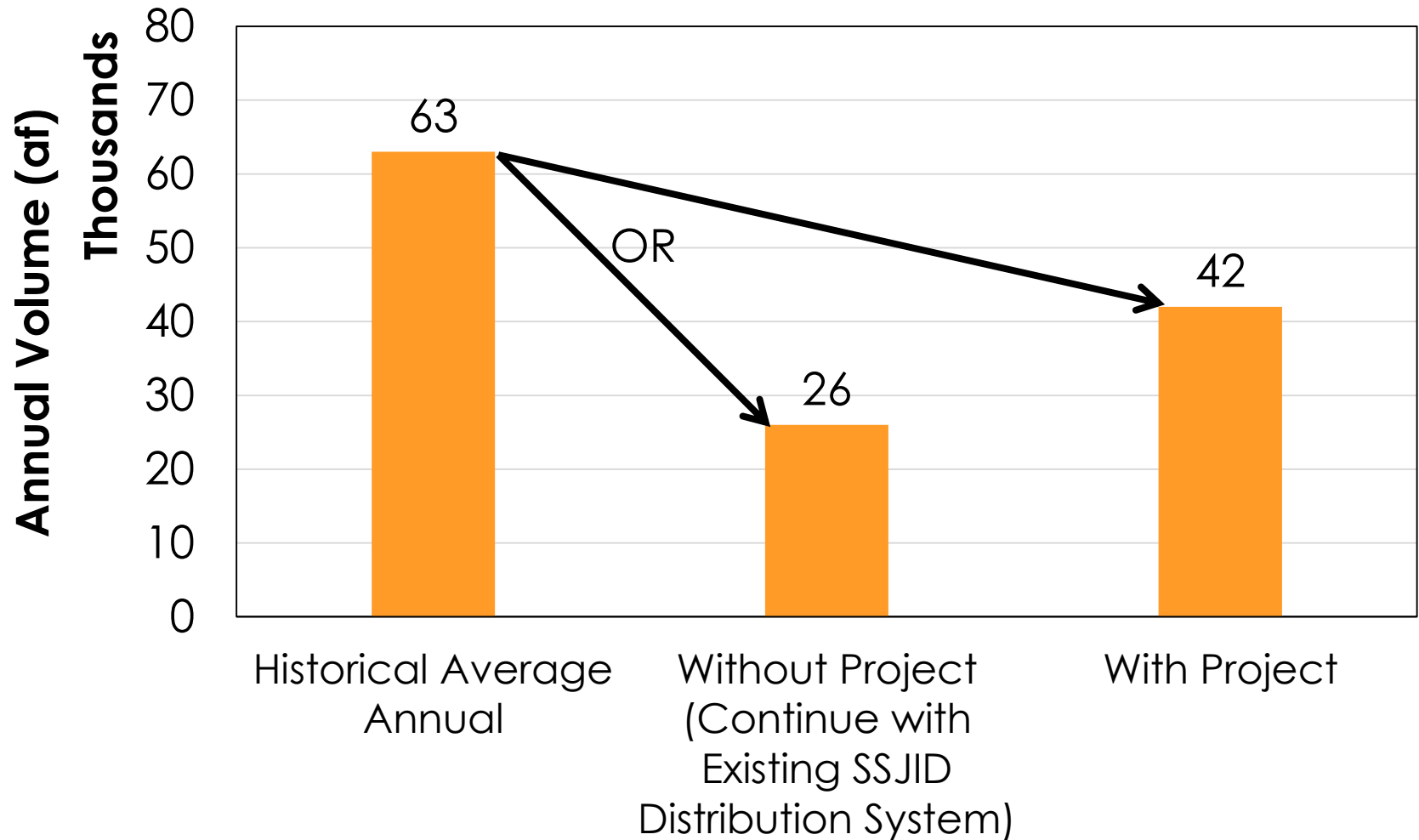
All units in acre-feet



Irrigation Modernization Opportunity Assessment

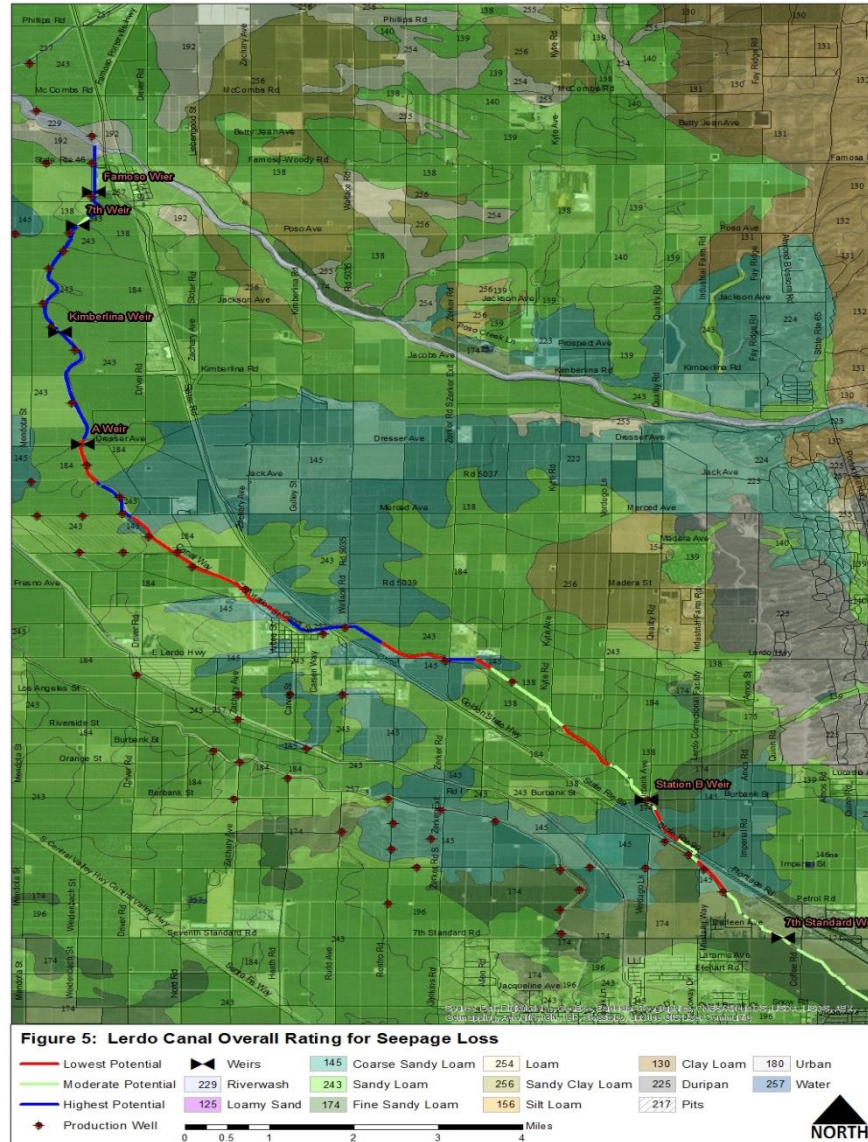
3. Water Balance

Net Groundwater Recharge



Irrigation Modernization Opportunity Assessment

4. Hydrogeology



Irrigation Modernization Opportunity Assessment

5. Customer Service, Capacity, and Operational Review

Irrigation Method	Water Source	Water Quality	Acreage	Min WTP	Max WTP
				\$ per acre-foot	
Flood	District	Suitable	13,700	46	46
Sprinkler	District	Suitable	13,000	42	42
Sprinkler	Ground water	Suitable	10,000	48	48
Sprinkler	Ground water	Marginal	6,000	164	178

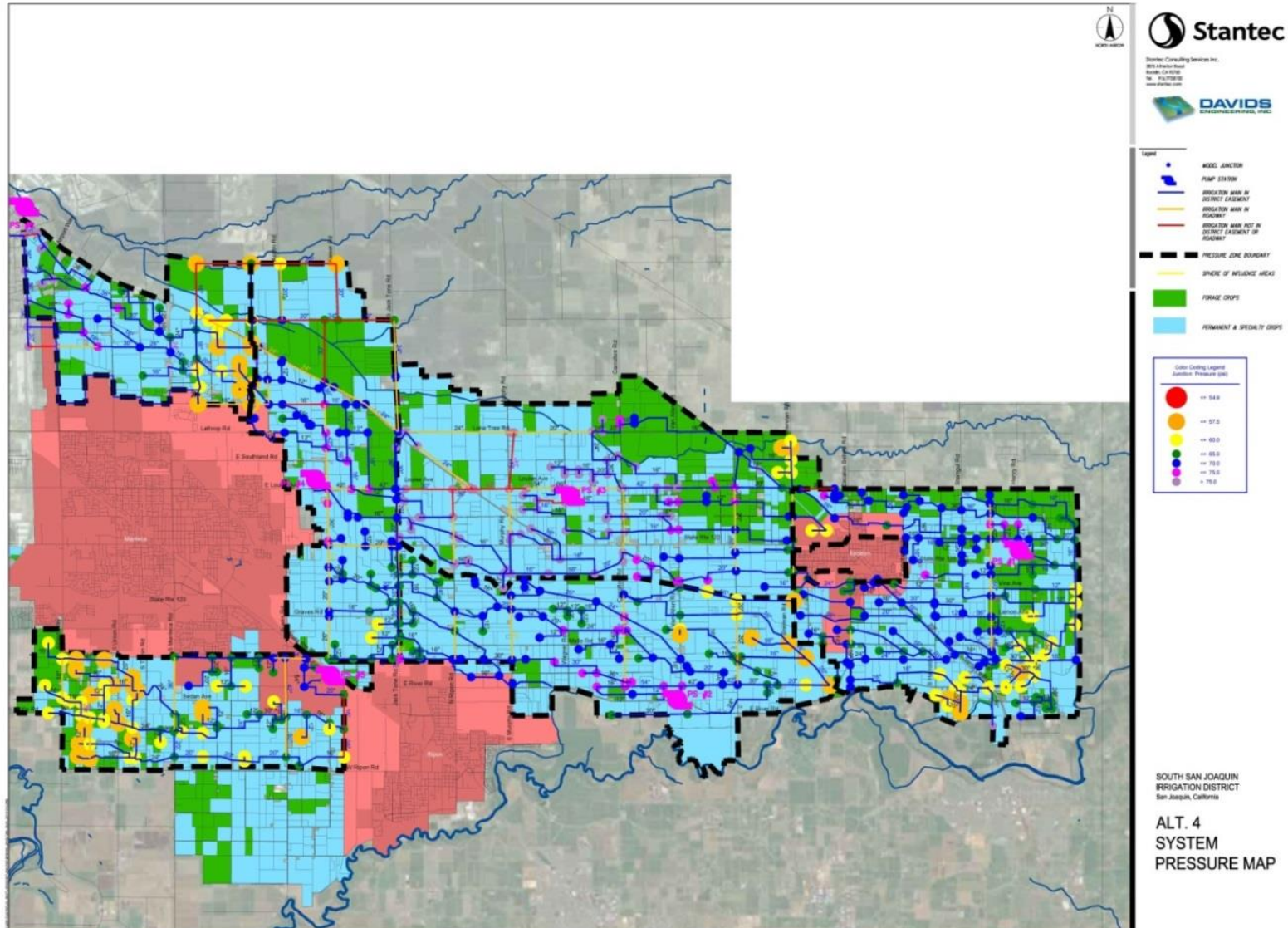
Irrigation Modernization Opportunity Assessment

6. Alternatives Development

Alternative	Number of Pump Stations	Piping the Main Canal (Yes/No)	Cost Optimization Summary	
			Pipelines	Pump Stations
1	1	Yes	Construction Contingency	Engineering and Environmental Permitting
1A	1	No		
2	3	Yes	Construction Management	Maintenance
2A	3	No		
3	6	Yes	Replacement	Annual Operations (Pump Station Energy)
3A	6	No		
4	6 - Decentralized	No		

Irrigation Modernization Opportunity Assessment

6. Alternatives Development



Irrigation Modernization Opportunity Assessment

7. Performance Indicators and Benefits

Realized Benefits On-Farm

- Crop Yields
- Crop quality
- Reduced production inputs, including water, fertilizer, pump energy and maintenance
- Reduced farm labor costs
- Reduction of on-farm pumping (including groundwater pumping)
- Reduced farm runoff and related improved ability to comply with water quality regulations

Irrigation Modernization Opportunity Assessment

7. Performance Indicators and Benefits

Realized Benefits On-Farm

- Improved delivery measurement and water management information
- Irrigation scheduling flexibility
- Improved air quality by eliminating diesel powered pumps
- Increased land values
- Reduced water application requirements due to high application efficiency, leading to increased drought year resiliency

Irrigation Modernization Opportunity Assessment

7. Performance Indicators and Benefits

Realized Benefits for District and the Community

- Reduced seepage, spillage, and evaporation losses
- Reduced overall energy use due to the higher efficiency associated with centralized, larger variable frequency driven pumps and solar powered automated grower turnouts.
- Reduced air emissions
- Reduced aquatic weed growth and need for chemical weed control applications
- Conservation of groundwater supplies as existing groundwater uses convert to surface water
- Protection of groundwater quality due to reduced leaching of fertilizers and less farm runoff.

Irrigation Modernization Opportunity Assessment

7. Performance Indicators and Benefits

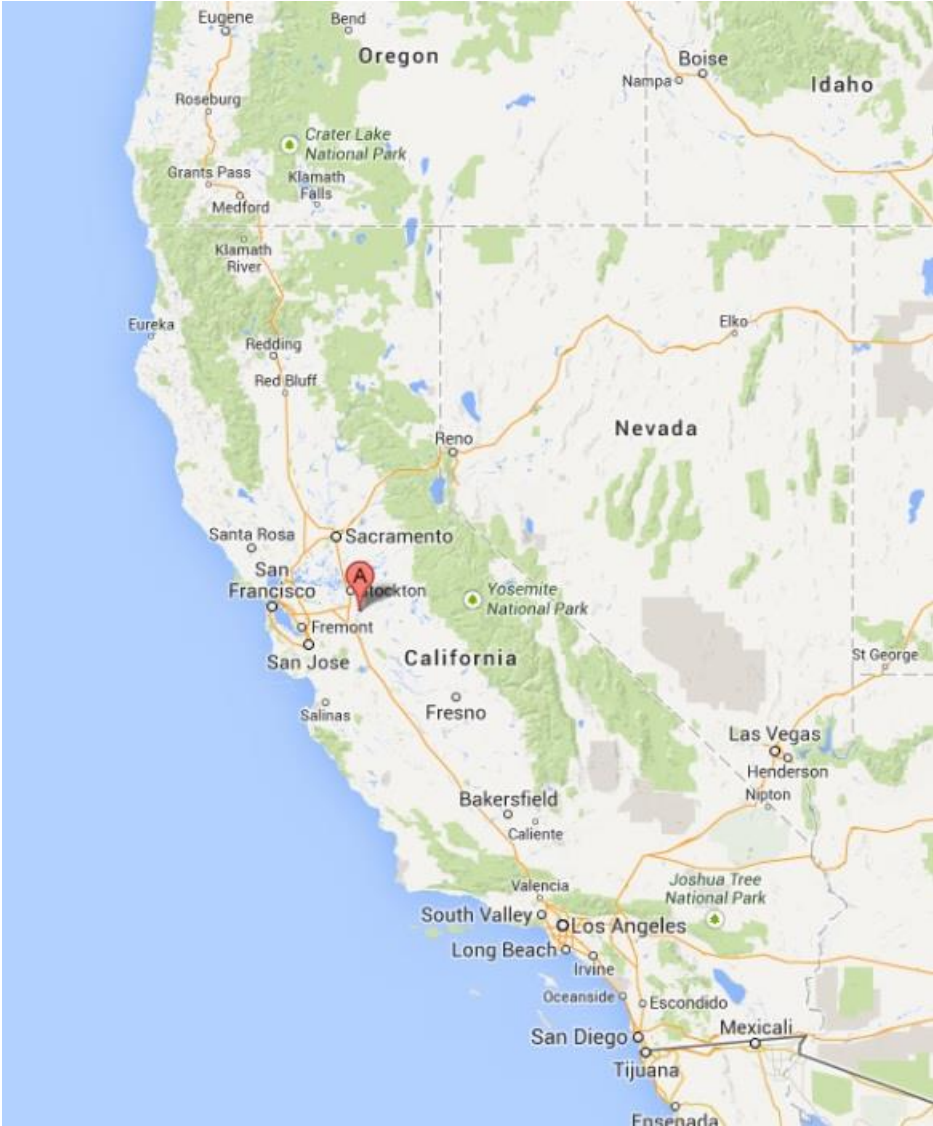
Realized Benefits for District and the Community

- Reduced operations labor, fleet mileage and air emissions (dust) due to reduced need to accompany flow changes through the system.
- Streamlined water administration due to automated billing and account management.
- Reduced maintenance costs (particularly in early years of the new system)
- Avoided capital costs associated with replacing aging gravity delivery infrastructure
- Increased beneficial use of District's water rights
- Enhanced ability to fully comply with State volumetric billing requirements

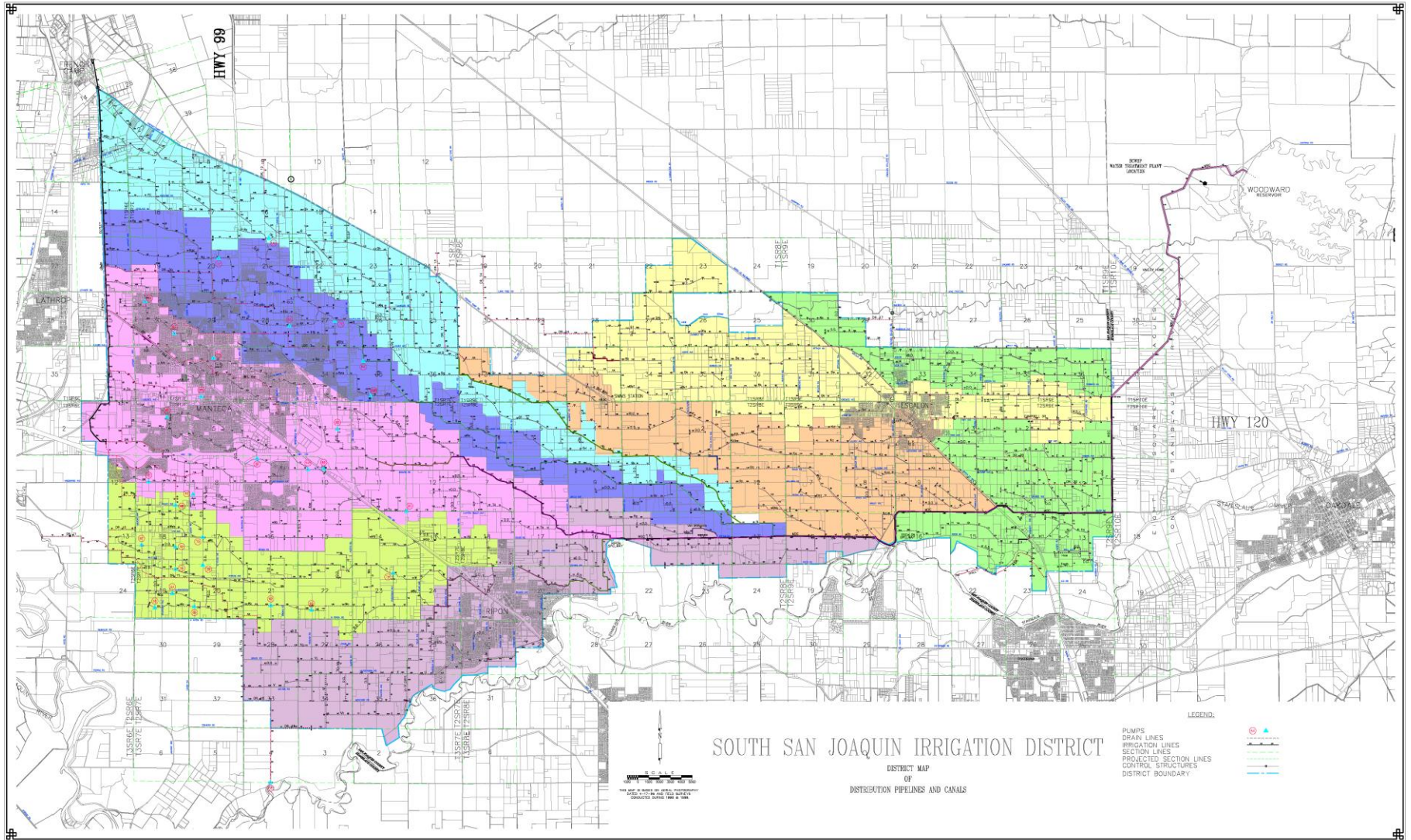
Project Example: The South San Joaquin Irrigation District Irrigation Modernization Program

- **SSJID Overview**
- **Reasons for the Irrigation Enhancement Project**
- **Irrigation Automation Process**
 1. **Moisture Sensors**
 2. **Ordering**
 3. **Processing**
 4. **Water Delivery**
 5. **Notification**
- **Project Realized Benefits**

SSJID Overview: District Location



SSJID Overview: Service Area and Existing Infrastructure



SSJID Overview: Typical Flood Irrigation Service

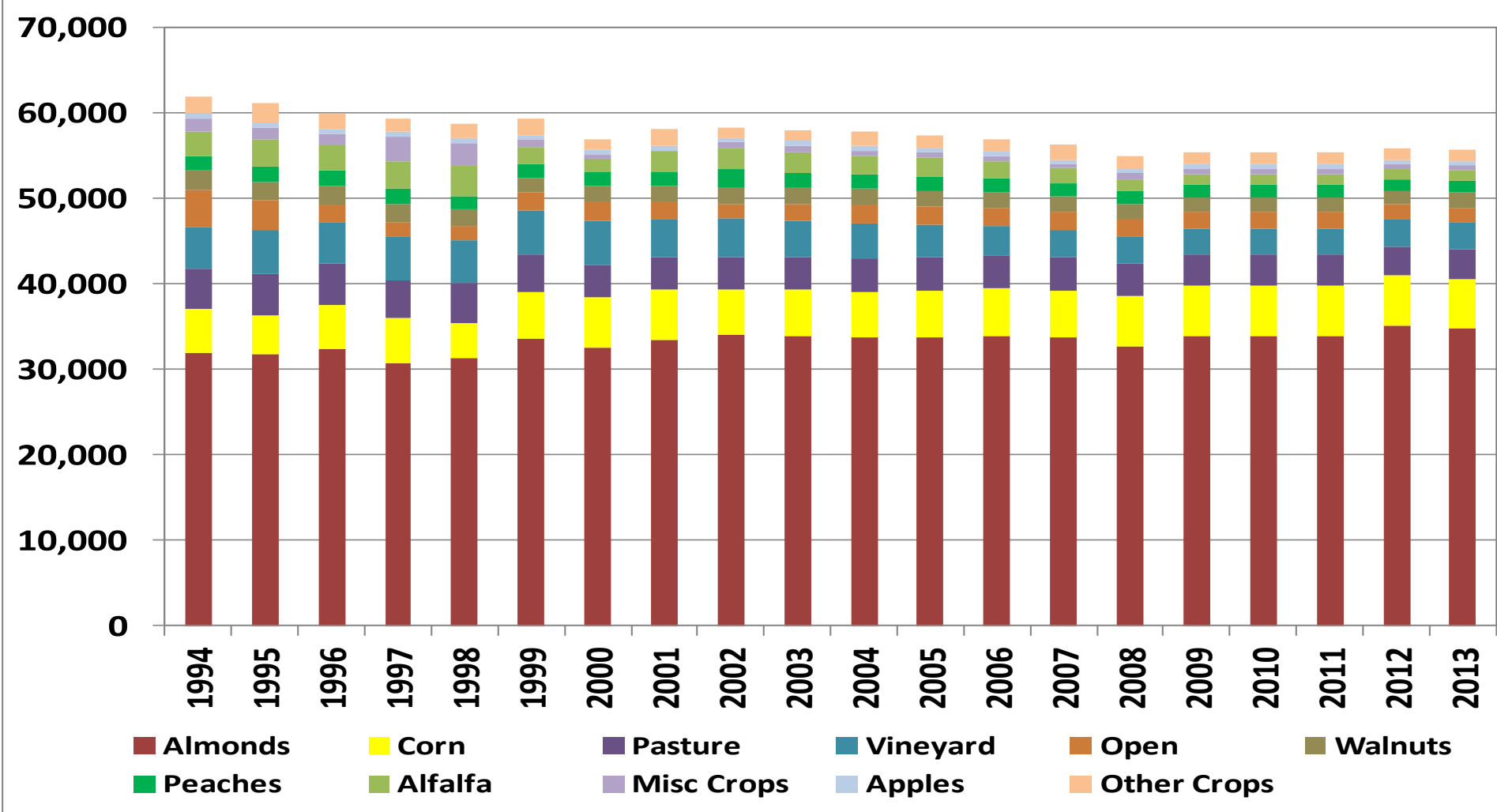


SSJID Overview: Typical Sprinkler Irrigation Service



SSJID Overview: Crops

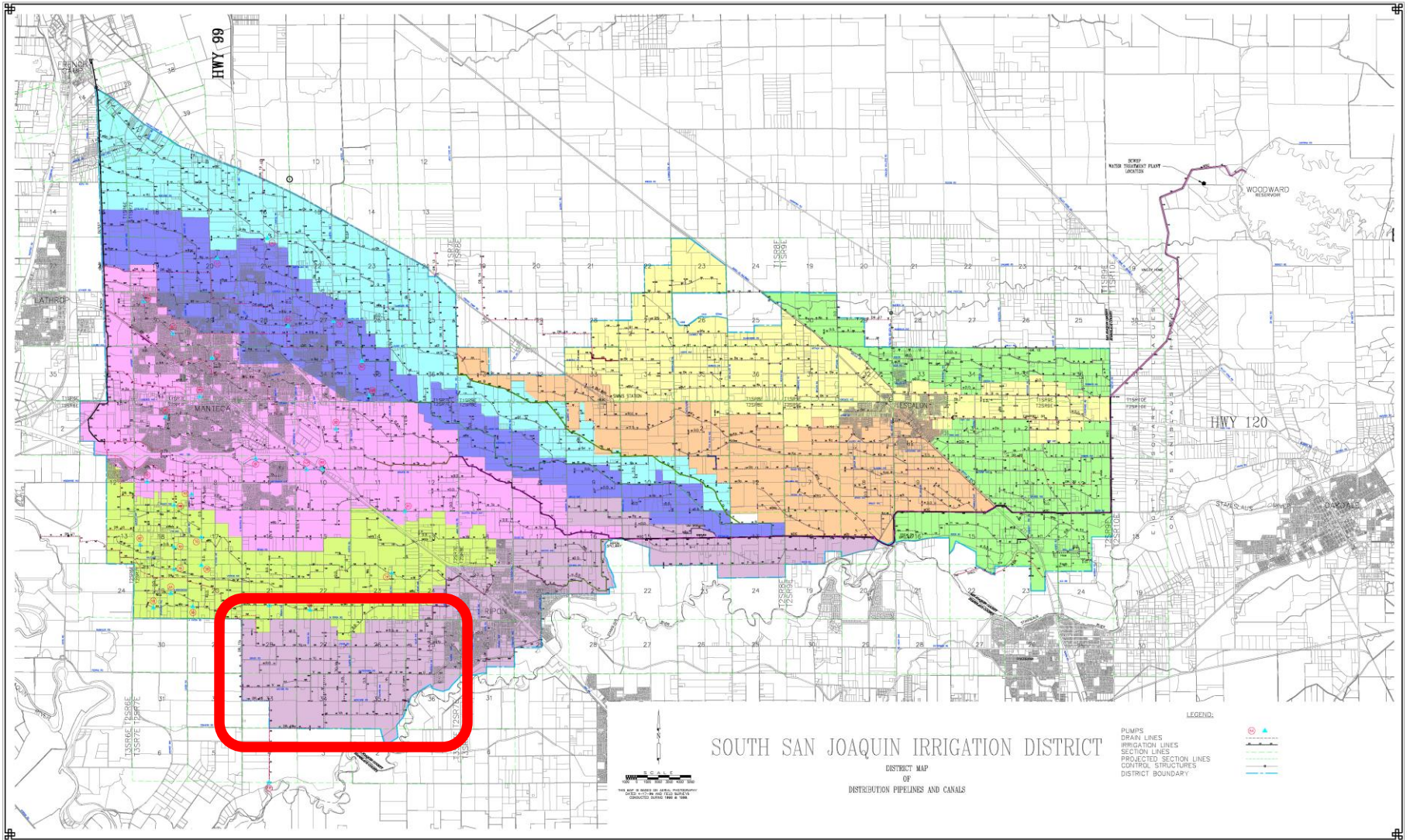
SSJID Cropping Pattern for 1994-2013 (excluding non-cropped land uses: yd/bldg and chicken/horse/dairy)



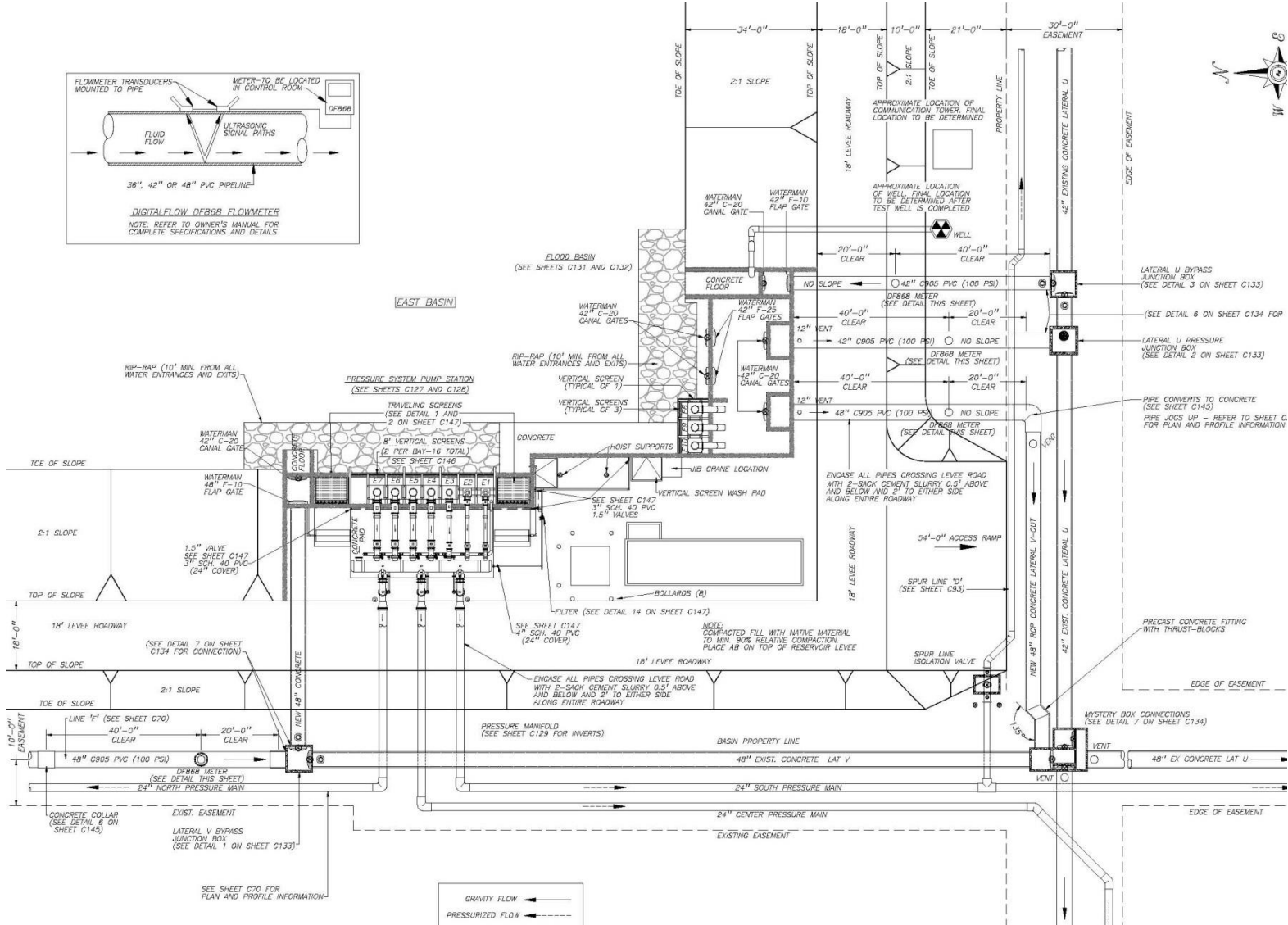
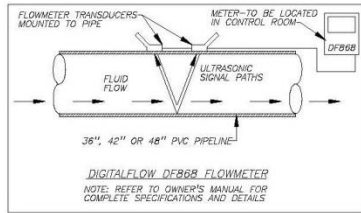
Reasons for the Irrigation Enhancement Project

- **Reduce gravity system losses and operational spills**
- **Increase on-farm irrigation efficiency**
- **Improve customer service**
- **Reduce environmental impacts and improve economic output (i.e - reduce groundwater pumping, farm runoff, production inputs, overall energy use, improve air quality and yields)**
- **Comply with volumetric billing requirements**

Project Location



Irrigation Enhancement Project Overview



Irrigation Enhancement Project Overview



SSJID DIVISION 9 IRRIGATION ENHANCEMENT PROJECT - 2012 DEDICATION CEREMONY

Photo by: milkhousestudios.com

Project Automation Overview

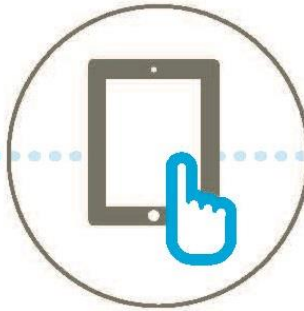
sensors

Field moisture sensors tell farmer the optimal time to irrigate.



ordering

Farmer orders water from personalized website. Order is sent to the SSJID web server.



processing

SSJID sends order to irrigation communications system.



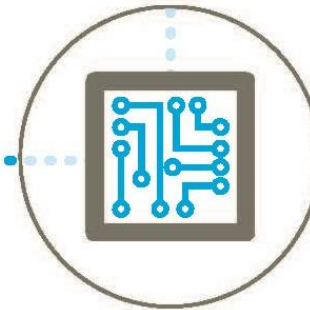
notification

Order is recorded on farmer's website and SSJID's dashboard for easy billing. Farmer receives text and email alerts throughout process.



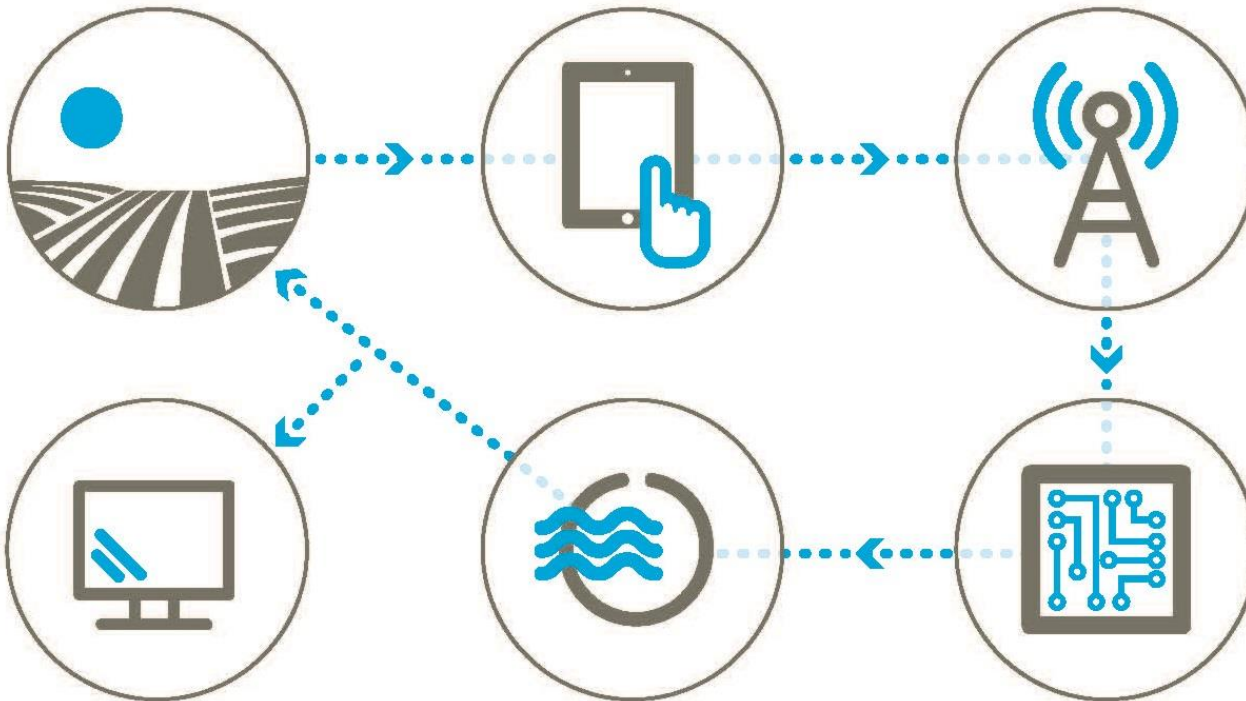
water

Turnout opens, regulates, meters, monitors, and provides feedback to district. Fields receive optimal irrigation.



RTU

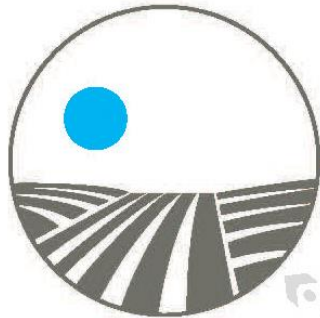
Within ten seconds of order, solar powered Remote Telemetry Unit (RTU) loads order into customer turnout.



Moisture Sensors Overview

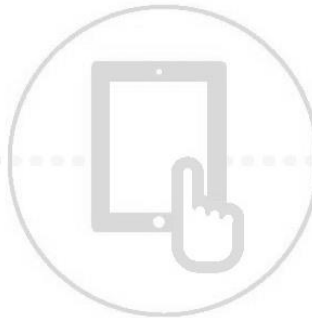
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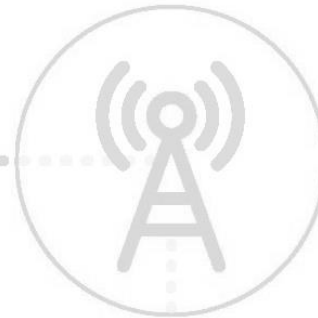
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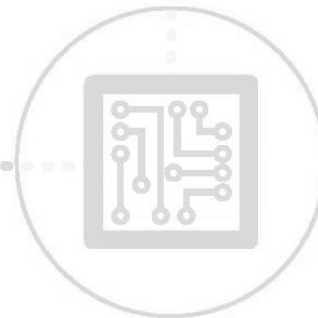
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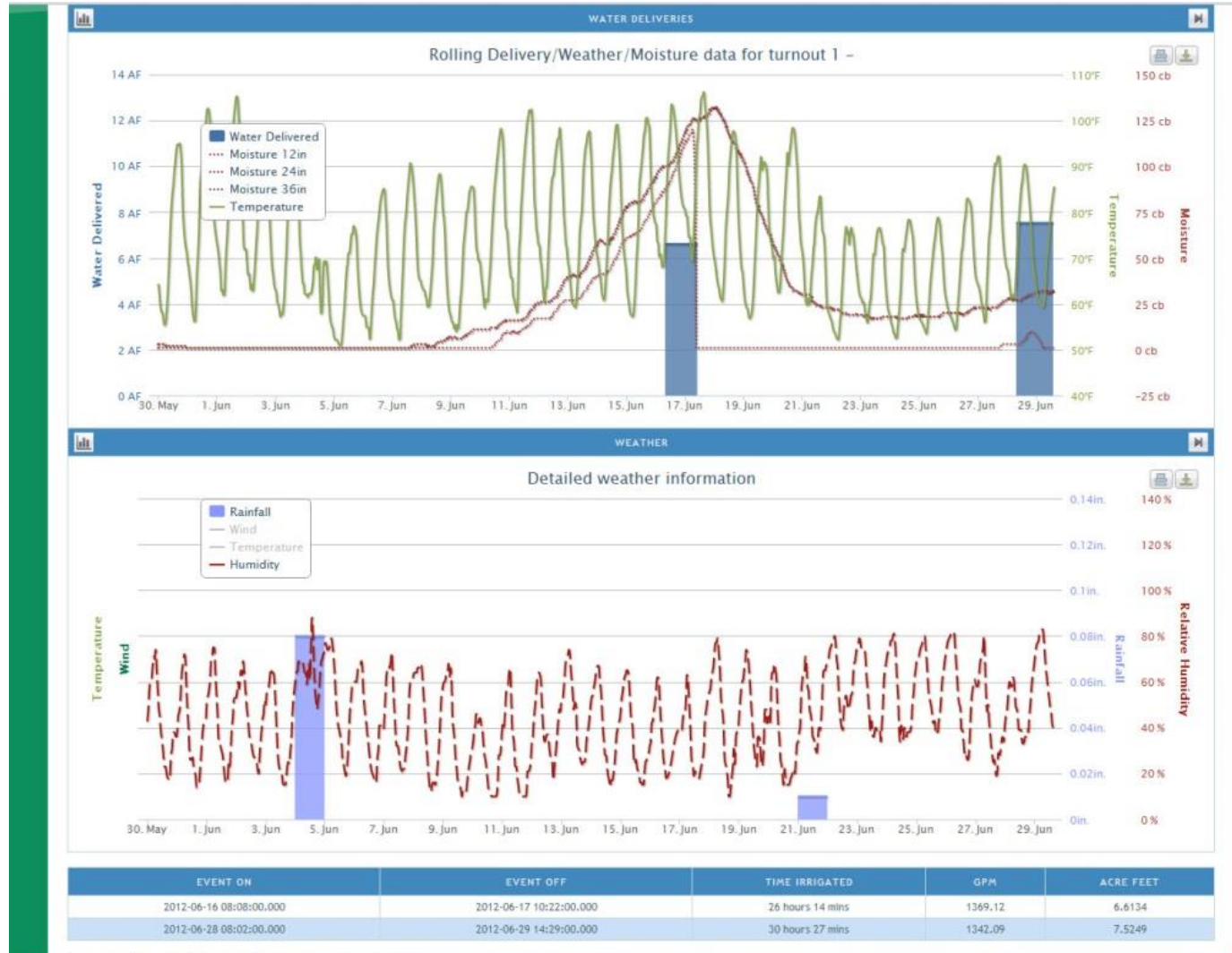


RTU

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Moisture Sensors Overview



Water Ordering Overview

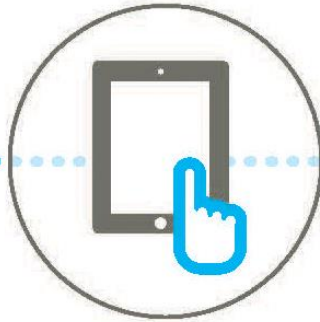
sensors

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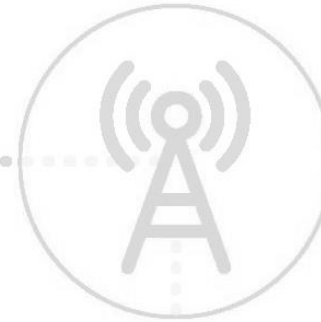
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processing

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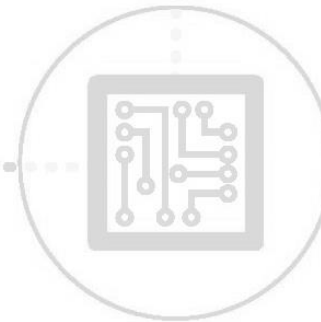
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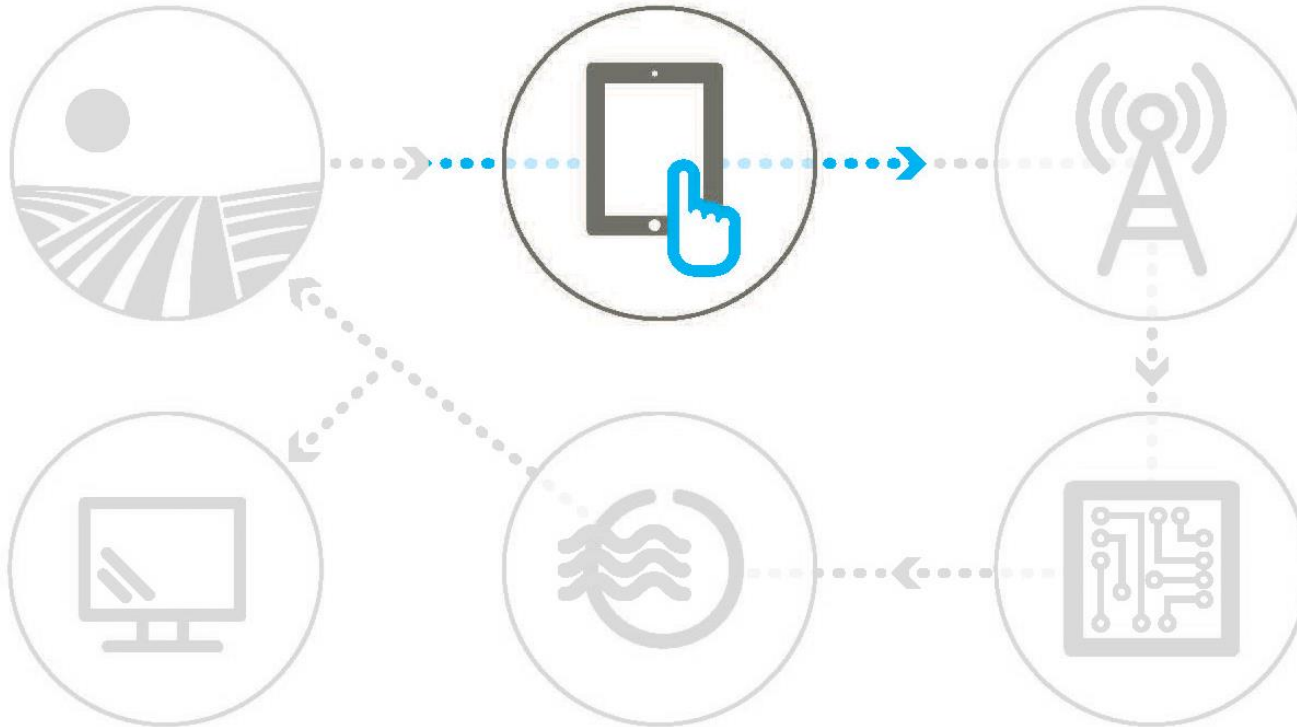
water

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RTU

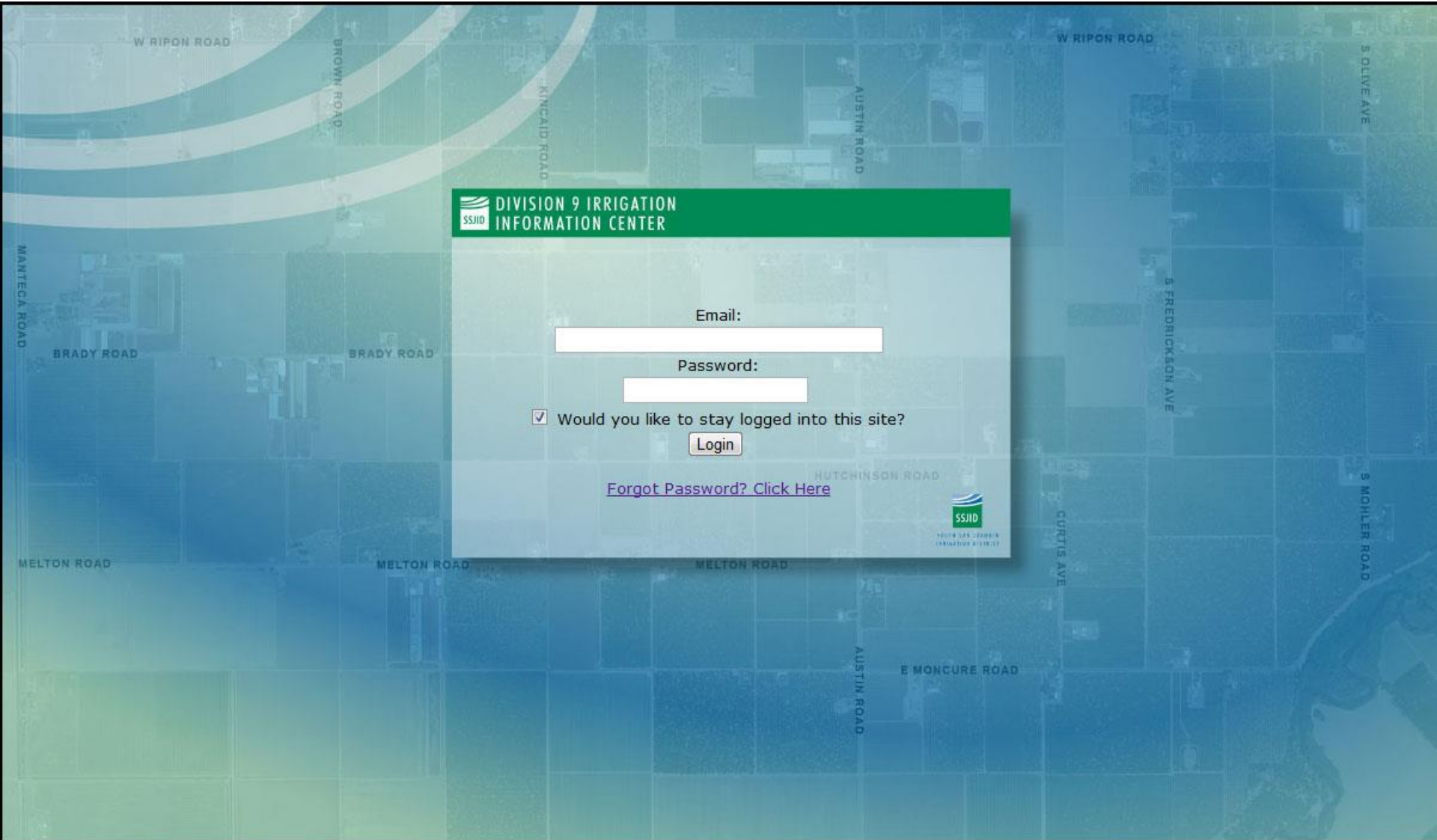
Within ten seconds of order, solar powered Remote Telemetry Unit (RTU) loads order into customer turnout.



Project Web Platform: Smart Phone and Tablet Enabled



Project Web Platform: Login Page



Project Web Platform: Weather and Et Pages

Turnout - Weather Historical Information Administration Help

Thursday
34.0° F - 54.0° F,
Clear, West at 2.0

Thursday Night
28.0° F - 57.0° F,
Clear, NW at 6.0

Friday
34.0° F - 59.0° F,
Partly Cloudy, NW at
4.0

Friday Night
36.0° F - 63.0° F,
Clear, NW at 3.0

Saturday
36.0° F - 64.0° F,
Partly Cloudy, NW at
3.0

Saturday Night
39.0° F - 64.0° F,
Clear, WNW at 2.0

NO CURRENT ALERTS

Significance:	NA	Phenomena:	NA
Time Issued:	1900-01-01 00:00:00.000	Time Expires:	1900-01-01 00:00:00.000

There are currently no national weather alerts.

ASTRONOMY

	Sunrise:		Sunset:
	2013-12-12 07:10:00.000		2013-12-12 16:46:00.000
Moon Age:	10	Moon Illuminated:	77.0 %

DETAILED WEATHER REPORT

Observation Location:	Woodward Park, Manteca, California		
Last Updated:	2013-12-12 09:04:42.000		
Weather:	Clear	Temp: 33.6 F	Humidity: 94%
Wind:	0	Windchill: 34.0	
Wind Direction: NNW	Wind Degrees: 330.0°	Wind: 0 Mph	Wind Gust: 6 Mph
Heat Index: 0.0 F	Solar Radiation: 0.0 UV	Rain Today: 0.0 In	
Dewpoint: 32.0 F	Visibility: 4.0 Miles	Pressure In: 30.27	Pressure Trend: +

Detailed weather information

The graph displays four data series over a seven-day period from December 6 to December 12. The left y-axis represents Rainfall (0 to 0.35 inches) and Wind (0 to 0.35 inches). The right y-axis represents Temperature (10 to 80 degrees Fahrenheit) and Relative Humidity (10 to 80 percent). Temperature is shown as a blue line, Wind as a green line, Rainfall as a green shaded area, and Humidity as a red line. A significant rainfall event is highlighted with a green vertical bar between December 7 and 8, reaching approximately 0.32 inches. The temperature fluctuates between roughly 20°F and 50°F, while relative humidity remains consistently high, near 90-95%.

RADAR

SATELLITE

Project Web Platform: Order Calendar

Turnout 19 - raymus
Weather ▾
Historical Information
Administration ▾
Help ▾

 Thursday 34.0° F - 54.0° F, Clear, West at 2.0	 Thursday Night 28.0° F - 57.0° F, Clear, NW at 6.0	 Friday 34.0° F - 59.0° F, Partly Cloudy, NW at 1.0	 Friday Night 36.0° F - 63.0° F, Clear, NW at 3.0	 Saturday 36.0° F - 64.0° F, Partly Cloudy, NW at 3.0	 Saturday Night 39.0° F - 64.0° F, Clear, WNW at 2.0
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REQUEST WATER.	TURNOUT 19 OVERVIEW												
Request Date: <input type="text"/> Request water for N/A hours <small>* Water deliveries must be placed 36 hours before delivery. Current maximum request limit: 7</small>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Turnout: <u>19</u></td> <td>Nickname: <u>raymus</u></td> <td>APN: 257-230-08</td> </tr> <tr> <td>Owner</td> <td colspan="2">Van Till, John</td> </tr> <tr> <td>Acres</td> <td colspan="2">67.72</td> </tr> <tr> <td>Crop</td> <td colspan="2"></td> </tr> </table>	Turnout: <u>19</u>	Nickname: <u>raymus</u>	APN: 257-230-08	Owner	Van Till, John		Acres	67.72		Crop		
Turnout: <u>19</u>	Nickname: <u>raymus</u>	APN: 257-230-08											
Owner	Van Till, John												
Acres	67.72												
Crop													

⏪ 📅 today June 2012 month week day

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
	Requested water delivery between May 28, 2012, 11:46 am and May 29, 2012, 7:45 am for a duration of 20 Hours Delivered 5.8953 AF, water delivered between May 28, 2012, 11:46 am and May 29, 2012, 7:45 am for a duration of 20 Hours				Requested water delivery between June 1, 2012, 1:00 am and June 1, 2012, 9:00 pm for a duration of 20 Hours Delivered 6.3863 AF, water delivered between June 1, 2012, 1:10 am and June 1, 2012, 9:04 pm for a duration of 20 Hours	
3	4	5	6	7	8	9
					Requested water delivery between June 8, 2012, 1:00 pm and June 9, 2012, 7:00 pm for a duration of 30 Hours Delivered 9.8295 AF, water delivered between June 8, 2012, 1:08 pm and June 9, 2012, 7:04 pm for a duration of 30 Hours	
10	11	12	13	14	15	16
					Requested water delivery between June 15, 2012, 6:00 am and June 15, 2012, 6:00 pm for a duration of 6 Hours Delivered 3.6307 AF, water delivered between June 15, 2012, 12:29 pm and June 15, 2012, 6:04 pm for a duration of 6 Hours	
17	18	19	20	21	22	23
			Requested water delivery between June 20, 2012, 7:00 am and June 21, 2012, 7:00 pm for a duration of 36 Hours Delivered 11.7446 AF, water delivered between June 20, 2012, 7:08 am and June 21, 2012, 7:03 pm for a duration of 36 Hours			
24	25	26	27	28	29	30
				Requested water delivery between June 28, 2012, 5:00 am and June 29, 2012, 5:00 pm for a duration of 36 Hours Delivered 11.4684 AF, water delivered between June 28, 2012, 5:09 am and June 29, 2012, 5:04 pm for a duration of 36 Hours		

Project Web Platform: Airline Ticketing Style Ordering

Turnout 19 - raymus Weather Historical Information Administration Help

Thursday 57.0° F - 90.0° F, Clear, WNW at 12.0	Thursday Night 57.0° F - 88.0° F, Clear, WNW at 11.0	Friday 59.0° F - 86.0° F, Clear, WNW at 13.0	Friday Night 57.0° F - 91.0° F, Clear, WNW at 9.0	Saturday 61.0° F - 100.0° F, Clear, WNW at 8.0	Saturday Night 59.0° F - 95.0° F, Clear, West at 8.0
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REQUEST WATER.

Request Date:

Request water for hours/minutes.

* Water deliveries must be placed 48 hours before delivery.

TURNOUT 19 OVERVIEW

Turnout: <u>19</u>	Nickname: <u>raymus</u>	APN: 257-230-08
Owner	Van Till	
Acres	76	
Crop	almonds	

AVAILABLE TIMES FOR 06/30/2012

12:00 am	N/A	1:00 am	N/A	2:00 am	N/A	3:00 am	N/A	4:00 am	N/A	5:00 am	N/A	6:00 am	N/A	7:00 am	<input type="radio"/>	8:00 am	<input type="radio"/>	9:00 am	<input type="radio"/>	10:00 am	<input type="radio"/>	11:00 am	<input type="radio"/>
12:00 pm	<input type="radio"/>	1:00 pm	<input type="radio"/>	2:00 pm	<input type="radio"/>	3:00 pm	<input type="radio"/>	4:00 pm	<input type="radio"/>	5:00 pm	<input type="radio"/>	6:00 pm	<input type="radio"/>	7:00 pm	<input type="radio"/>	8:00 pm	<input type="radio"/>	9:00 pm	<input type="radio"/>	10:00 pm	<input type="radio"/>	11:00 pm	<input type="radio"/>

[Schedule Request 06/30/2012](#)

AVAILABLE TIMES FOR 07/01/2012 (1 DAY AFTER)

12:00 am	<input type="radio"/>	1:00 am	<input type="radio"/>	2:00 am	<input type="radio"/>	3:00 am	<input type="radio"/>	4:00 am	<input type="radio"/>	5:00 am	<input type="radio"/>	6:00 am	<input type="radio"/>	7:00 am	<input type="radio"/>	8:00 am	<input type="radio"/>	9:00 am	<input type="radio"/>	10:00 am	<input type="radio"/>	11:00 am	<input type="radio"/>
12:00 pm	<input type="radio"/>	1:00 pm	<input type="radio"/>	2:00 pm	<input type="radio"/>	3:00 pm	<input type="radio"/>	4:00 pm	<input type="radio"/>	5:00 pm	<input type="radio"/>	6:00 pm	<input type="radio"/>	7:00 pm	<input type="radio"/>	8:00 pm	<input type="radio"/>	9:00 pm	<input type="radio"/>	10:00 pm	<input type="radio"/>	11:00 pm	<input type="radio"/>

[Schedule Request 07/01/2012](#)

AVAILABLE TIMES FOR 07/02/2012 (2 DAYS AFTER)

12:00 am	N/A	1:00 am	N/A	2:00 am	N/A	3:00 am	N/A	4:00 am	N/A	5:00 am	N/A	6:00 am	N/A	7:00 am	N/A	8:00 am	N/A	9:00 am	N/A	10:00 am	N/A	11:00 am	N/A
12:00 pm	N/A	1:00 pm	N/A	2:00 pm	N/A	3:00 pm	N/A	4:00 pm	N/A	5:00 pm	N/A	6:00 pm	N/A	7:00 pm	N/A	8:00 pm	N/A	9:00 pm	N/A	10:00 pm	N/A	11:00 pm	N/A

[Schedule Request 07/02/2012](#)

AVAILABLE TIMES FOR 07/03/2012 (3 DAYS AFTER)

12:00 am	N/A	1:00 am	N/A	2:00 am	N/A	3:00 am	N/A	4:00 am	N/A	5:00 am	N/A	6:00 am	<input type="radio"/>	7:00 am	<input type="radio"/>	8:00 am	<input type="radio"/>	9:00 am	<input type="radio"/>	10:00 am	<input type="radio"/>	11:00 am	<input type="radio"/>
12:00 pm	<input type="radio"/>	1:00 pm	<input type="radio"/>	2:00 pm	<input type="radio"/>	3:00 pm	<input type="radio"/>	4:00 pm	<input type="radio"/>	5:00 pm	<input type="radio"/>	6:00 pm	<input type="radio"/>	7:00 pm	<input type="radio"/>	8:00 pm	<input type="radio"/>	9:00 pm	<input type="radio"/>	10:00 pm	<input type="radio"/>	11:00 pm	<input type="radio"/>

[Schedule Request 07/03/2012](#)

System Communications

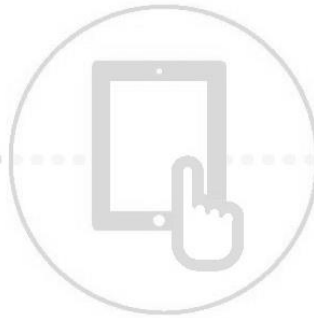
sensors

Field moisture sensors tell farmer the optimal time to irrigate.



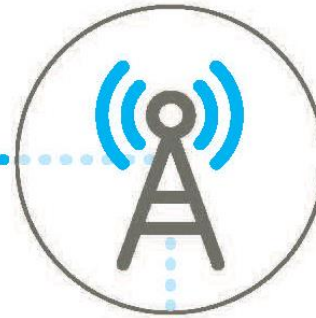
ordering

Farmer orders water from personalized website. Order is sent to the SSJID web server.



processing

SSJID sends order to irrigation communications system.



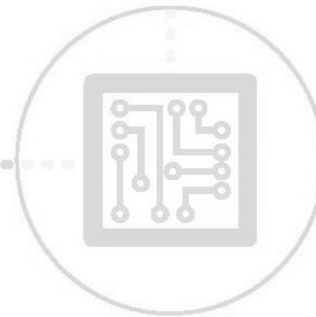
notification

Order is recorded on farmer's website and SSJID's dashboard for easy billing. Farmer receives text and email alerts throughout process.



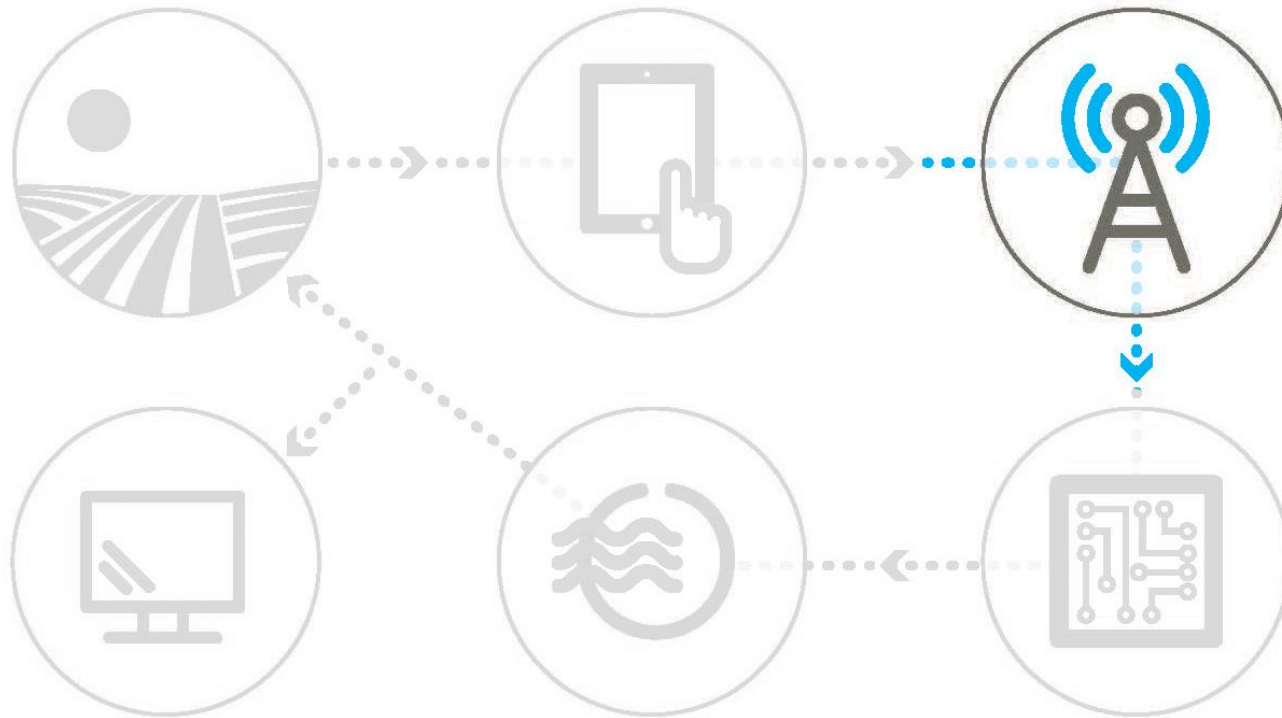
water

Turnout opens, regulates, meters, monitors, and provides feedback to district. Fields receive optimal irrigation.



RTU

Within ten seconds of order, solar powered Remote Telemetry Unit (RTU) loads order into customer turnout.



System Communications: Control Room



System Communications: East Basin Radio Tower



System Communications: Transmission to Remote Telemetry Unit



Remote Telemetry Units

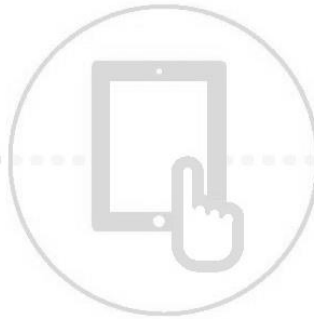
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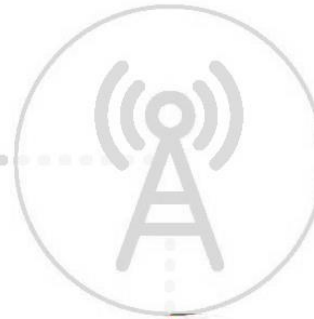
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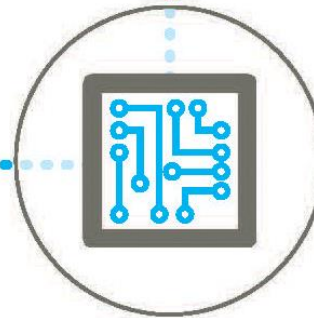
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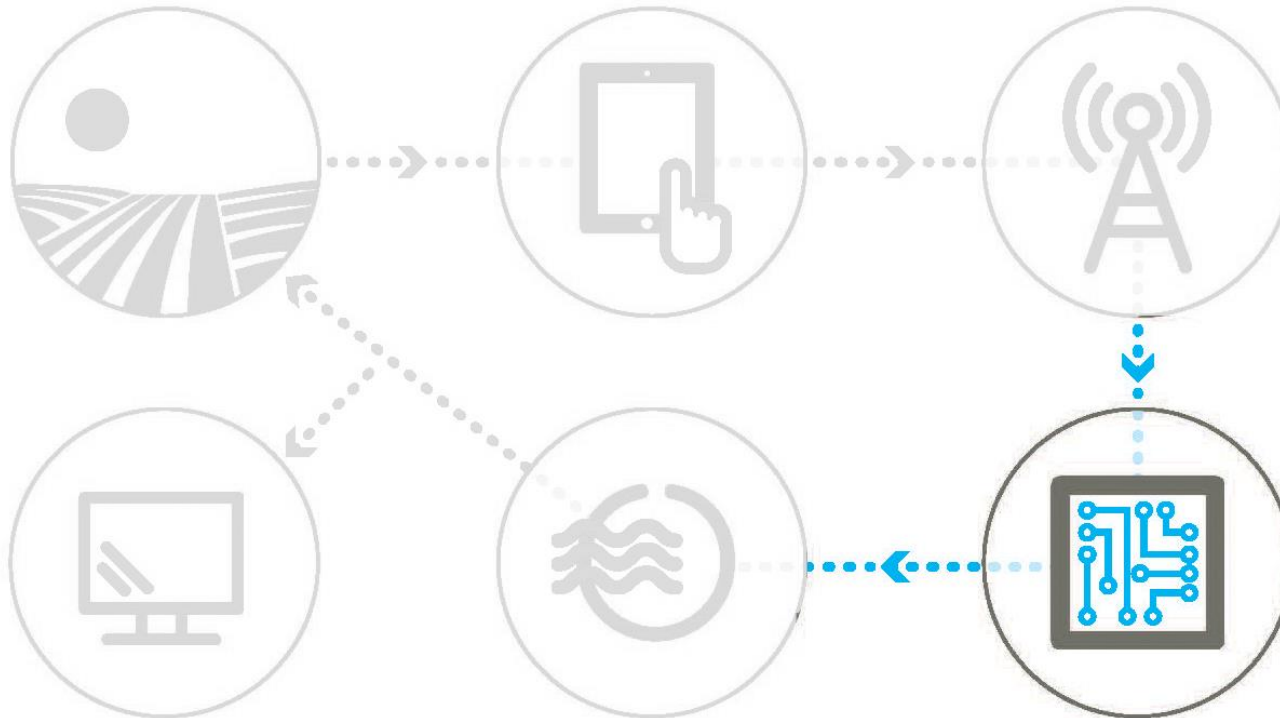
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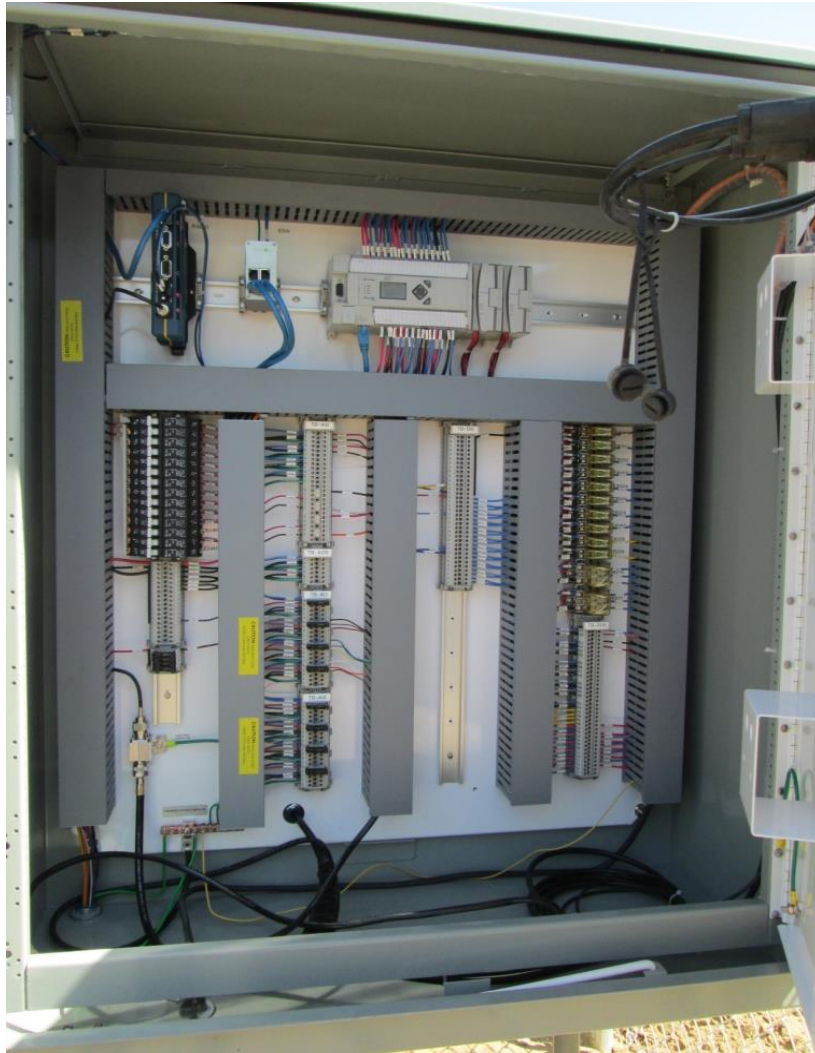
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Remote Telemetry Units



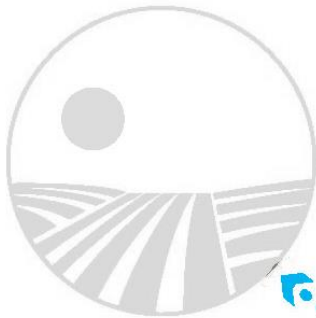
Remote Telemetry Units: RTU Control and Battery Cabinets



Water Delivery Overview

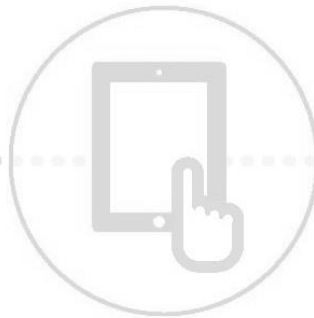
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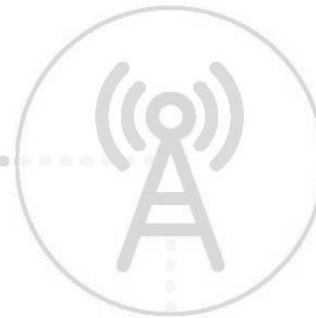
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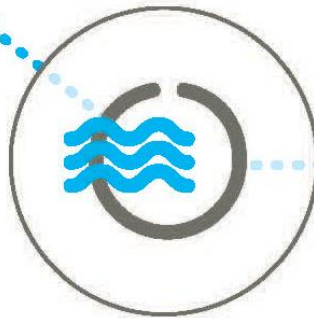
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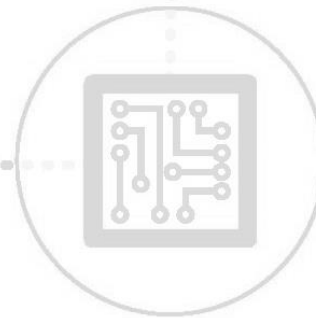
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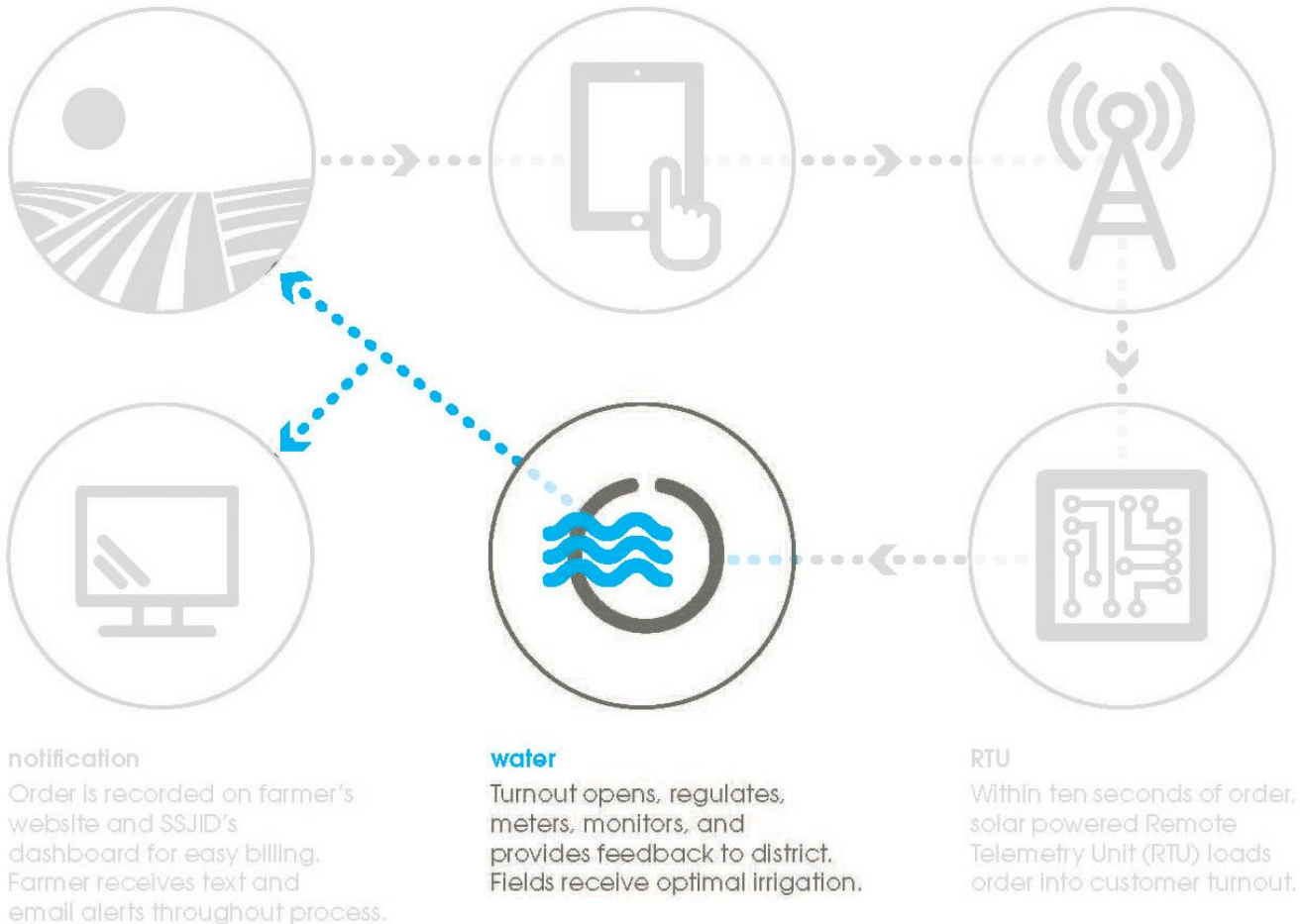
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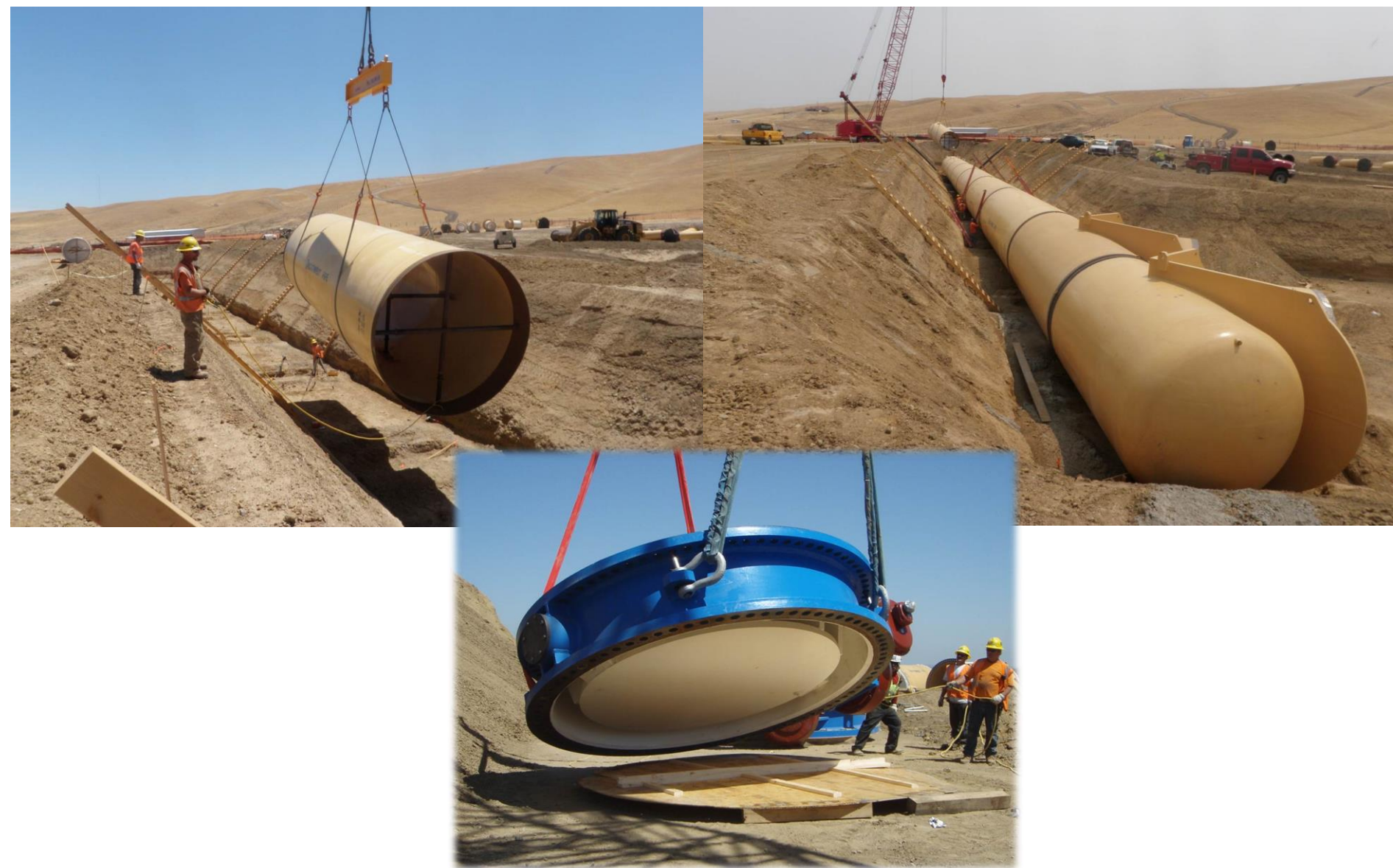
Water Delivery Overview: Regulating Reservoir and Pump Station



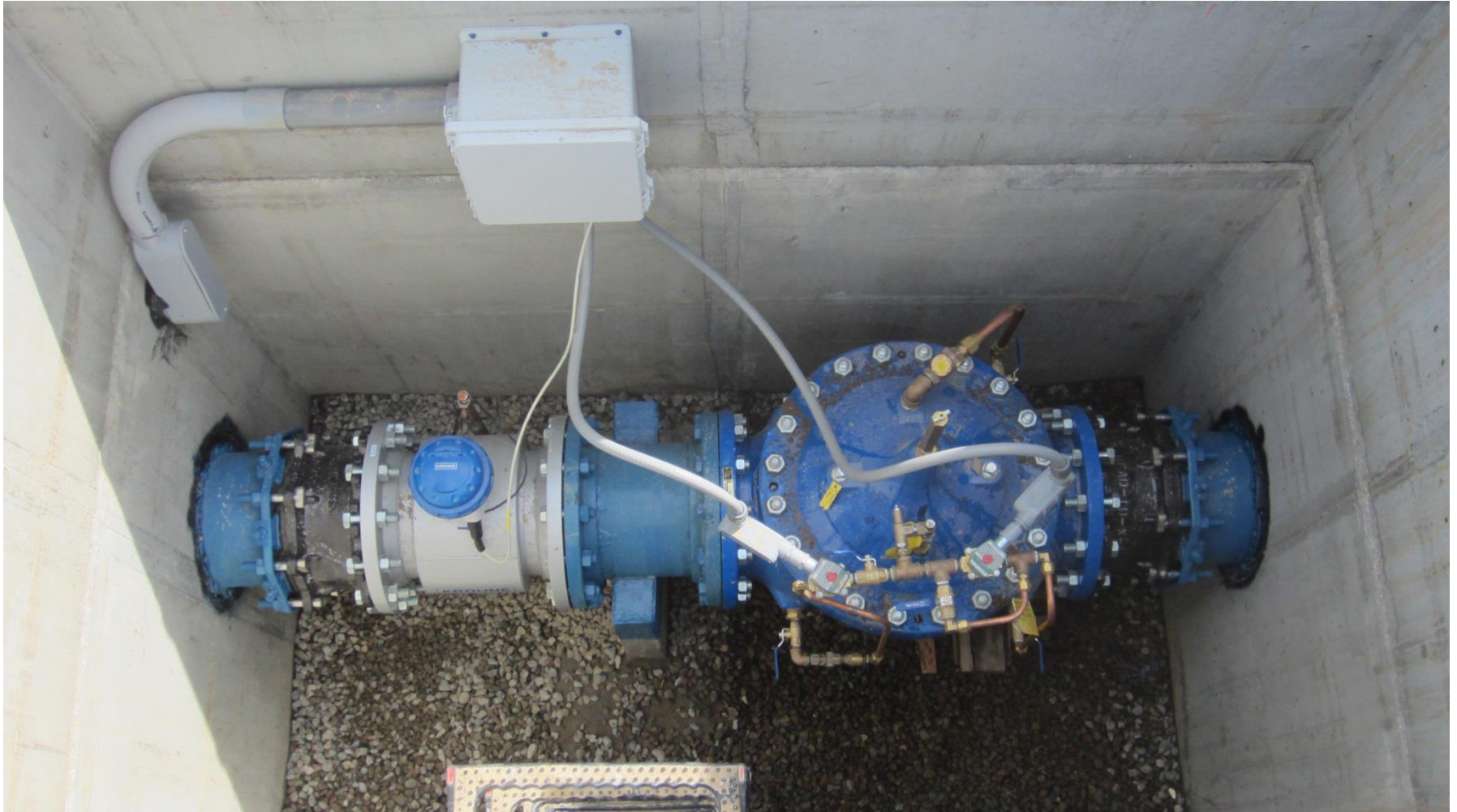
Water Delivery Overview: Distribution System



Water Delivery Overview: Another Distribution System Installation



Water Delivery Overview: Typical Customer Turnout



Water Delivery Overview: Typical On-Farm Setup



Water Delivery Overview: Farmer Ordering Demonstration Video

Notifications and District Management

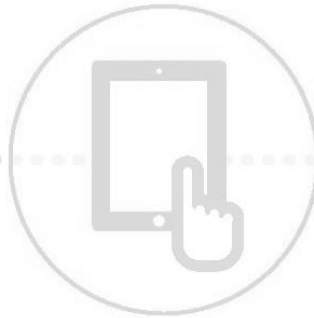
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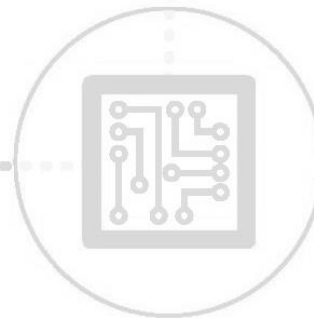
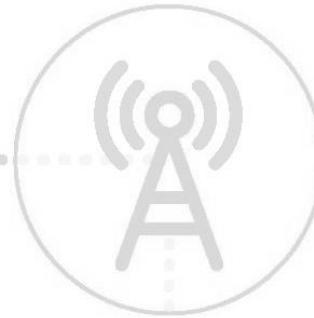
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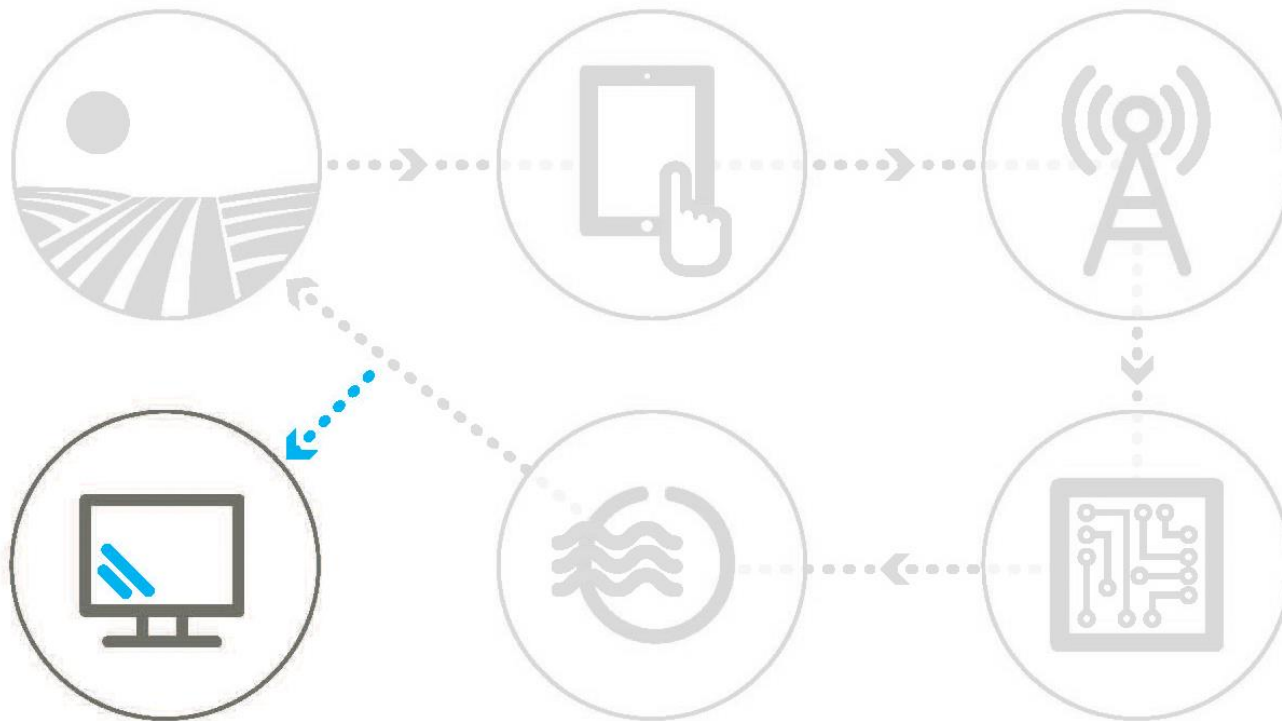
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Within ten seconds of order, solar powered Remote Telemetry Unit (RTU) loads order into customer turnout.



Project Web Platform: Custom Email/Text Alerts

Turnout - ▾ Weather ▾ Historical Information Administration Help ▾

24 hour before (Email) ▾

MODIFY TEMPLATES

TEMPLATE	#	#	#	#
%first_name%, 24 hour SSJID delivery reminder				

```

%first_name%, you have an upcoming water delivery, the upcoming water delivery has the following information.

Turnout Number: %to_number%
Delivery Start: %to_start_time%
Delivery End: %to_end_time%
Estimated Flow: %to_est_flow_gpm%
Requested By: %requester_first_name% %requester_last_name%.

SSJID Irrigation Delivery Reminder.
    
```

Submit

USER VARIABLES

Variable	Description
%to_number%	Turnout Number
%first_name%	Users First Name
%last_name%	Users Last Name
%to_est_flow_gpm%	TO Estimated Flow
%to_start_time%	TO Time To Open
%to_end_time%	TO Time To Close
%requester_first_name%	Who requested the water delivery (first name)
%requester_last_name%	Who requested the water delivery (last name)
%to_act_flow_gpm%	Actual reported flow in gpm
%to_water_received%	Actual reported gallons in gal
%to_water_receivedAF%	Actual reported gallons in AF
%to_start_time_received%	Time Delivery Started
%to_end_time_received%	Time Delivery Started
%request_status%	Delivery status (Successful/Partial/Not Successful)
%to_crop%	Crop Type
%debug_alert_detailID%	Debug alert_detailID -> Used for troubleshooting email/texts

Project Web Platform: Farmer Turnout Management

Turnout 86 - Dale/CC ▾ Weather ▾ Historical Information Administration Help ▾

TURNOUT INFORMATION

Turnout Number:	57
Turnout Nickname:	hutchinson rd
APN:	257-240-22
Owner:	Fisher Farms
Property:	
Crop:	
Acres:	29
Zone:	F
Diameter:	8.0
Capacity Limit (gpm):	1800.0
Line:	A - HUTCHINSON
Northing:	2087189.43
Easting:	6367713.07
FTU:	9
Active:	<input checked="" type="checkbox"/>
Date Added:	

USERS ATTACHED TO THIS TURNOUT

NAME	EMAIL	PHONE	PROVIDER	ALERTS TEXT EMAIL	ACTIVE	OPTIONS
Mark Fisher	fishermj02@aol.com		Verizon Wireless	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Remove"/>

*Regular text messaging rates may apply

ALERT SETTINGS FOR THIS TURNOUT

ALERT TYPE	OPTIONS	ACTIVE
Send out alert 24 hours before scheduled water delivery.	<input type="button" value="Disable"/>	<input checked="" type="checkbox"/>
Send out alert one hour before scheduled water delivery.	<input type="button" value="Disable"/>	<input checked="" type="checkbox"/>
Send out alert if water delivery was not successful	<input type="button" value="Disable"/>	<input checked="" type="checkbox"/>
Send out alert if water delivery was 100% successful	<input type="button" value="Disable"/>	<input checked="" type="checkbox"/>

NOTES ATTACHED TO THIS TURNOUT

TURNOUT ENABLE/DISABLE

Disable turnout due to delinquent bill. (10 day grace period) <input type="button" value="Disable"/>	Disable turnout due to construction/maintenance <input type="button" value="Disable"/>
---	---

Project Web Platform: Operator Dashboard

SSJID Information Center x
https://waterorders.ssjid.com/op_dash.php
 Apps Imported From Firef... Suggested Sites San Joaquin Tributar... HEAT Self Service Imported From IE California Municipal... Stuck In Customs |... DWR Calendar Healthy Food for All Vol.1 No.1 2013 -... Welcome to HDPE.c... ASABE Technical Lib... Other bookmarks

DIVISION 9 IRRIGATION INFORMATION CENTER Logged in: Jeff Shaw
Logout

Turnout - Weather - Historical Information Administration Help

REALTIME SCADA STATS

Current Flow	11,980.06 gpm
Basin Volume	42.00 AF
Basin Level	9.60 ft
Pump Pressure	60.41 psi
U Inlet Flow	11,457.19 gpm
V Inlet Flow	51.56 gpm
U Outlet Flow	171.56 gpm
V Outlet Flow	0.00 gpm
Time Until Empty	270.49 hr
Time Until Full	0.00 hr
Est. Turnouts Open	10
Data Last Updated	July 1, 2014, 6:17 am
*Data automatically refreshes every 2.5 minutes	

SYSTEM OVERVIEW

System Online	Yes
Event Scheduler/System Rules	View
# of Zones	N/A
Total System Capacity	24,500 gpm
Current System Capacity	0 gpm
Est. Flow	14,586.22
Est. Orders 07/01/14	17,668,655.58 gal 12,269.90 avg gpm
Est. Orders 07/02/14	15,473,515.06 gal 10,745.50 avg gpm
View Requests	
Open Turnouts (est)	10
Closed Turnouts (est)	68
# of Turnouts	78
# of Accounts	52
Total Water Orders - Lifetime	3,342
Total AF Delivered	15,199.48 AF
SCADA	
Automation Watchdog Service	

7 DAY WATER USE VIEW MORE

Basin Statistics

View Detailed Chart (PSI/Est. Orders)

ACTIVE WATER REQUESTS

- Duane Winters request for water at Turnout 7 at an estimated flow of 1784.95 gpm starting at June 30, 2014, 6:00 am ending at July 2, 2014, 6:00 pm
- Duane Winters request for water at Turnout 14 at an estimated flow of 1138.81 gpm starting at June 30, 2014, 6:00 am ending at July 1, 2014, 12:00 pm
- Duane Winters request for water at Turnout 24 at an estimated flow of 1608.99 gpm starting at June 30, 2014, 6:00 am ending at July 1, 2014, 12:00 pm
- Stephen Brocchini request for water at Turnout 31 at an estimated flow of 1609.83 gpm starting at June 30, 2014, 7:00 am ending at July 2, 2014, 7:00 am
- Steve Van Duyn request for water at Turnout 1 at an estimated flow of 1309.82 gpm starting at June 30, 2014, 8:00 am ending at July 1, 2014, 8:00 am
- Steve Van Duyn request for water at Turnout 53 at an estimated flow of 1766.93 gpm starting at June 30, 2014, 8:00 am ending at July 1, 2014, 8:00 pm
- Phil Mohler request for water at Turnout 63 at an estimated flow of 2618.85 gpm starting at June 30, 2014, 9:00 am ending at July 3, 2014, 9:00 am
- Josh Cunningham request for water at Turnout 39 at an estimated flow of 842.48 gpm starting at June 30, 2014, 1:00 pm ending at July 1, 2014, 7:00 pm

6:22 AM 7/1/2014

Project Web Platform: Event Scheduler and System Rules

Turnout - Weather - Historical Information **Administration** Help

Return to Operator Dashboard

EVENT SCHEDULER

CURRENT RULE		BASELINE LIMIT	
Current System Limit:	0 gpm	11,000 gpm	
* Current plan:	Schedule (2)		

ID	START TIME	END TIME	LIMIT	ENTERED BY	NOTE	ACTIONS
2	12/02/2013 1:00:00 AM	04/15/2014 1:00:00 AM	0 gpm	District Administrator		
4	05/01/2014 8:00:00 AM	05/05/2014 12:00:00 AM	5,100 gpm	District Administrator		
3	06/04/2014 7:00:00 AM	07/08/2014 10:00:00 AM	1,100 gpm	District Administrator		

Add new event

View Historical Schedules

Click to re-activate the schedule

SYSTEM RULES

Irrigation Hours	72
Maximum Pending Requests	7
Request Delay	36
Maximum number of days in the future farmers are allowed to schedule water	15
Update	

* Changing this value will modify how long farmers may schedule irrigations for. It does not effect existing water deliveries.

Project Web Platform: Delivery Management

Turnout - ▾ Weather ▾ Historical Information Administration Help ▾

Today's Requests View All Open Requests View Historical Requests View Deliveries Delete Historical Requests Return to Overview

REQUEST OVERVIEW	
Viewing	Historical Requests
# of Requests	14
Totaling	37,824 AF

QUERY	
Start:	09/07/2013 on turnout *
End:	09/08/2013 where status is: All
Filter Data	

TO NO.	STATUS	REQ. ID	TYPE	START	END	FLOW	ACT. VOL GAL	ACT. VOL AF	ACTIONS
17	Complete	3325	Request Delivery	09/08/13 7:00 AM 09/08/13 7:01 AM	09/08/13 7:00 PM 09/08/13 7:04 PM	537.736 gpm 561.549 gpm	387170 gal 406000 gal	1.1882 AF 1.246 AF	<input type="checkbox"/> <input type="checkbox"/>
17	Partial	3309	Request Delivery	09/07/13 7:00 AM 09/07/13 7:01 AM	09/07/13 5:00 PM 09/07/13 5:37 PM	534.848 gpm 537.736 gpm	320909 gal 342000 gal	0.9848 AF 1.0496 AF	<input type="checkbox"/> <input type="checkbox"/>
21	Complete	3319	Request Delivery	09/07/13 4:00 PM 09/07/13 4:00 PM	09/08/13 4:00 PM 09/08/13 4:03 PM	1610.534 gpm 2159.39 gpm	2319168 gal 3116000 gal	7.1173 AF 9.5626 AF	<input type="checkbox"/> <input type="checkbox"/>
28	Partial	3269	Request Delivery	09/08/13 1:00 AM 09/08/13 1:00 AM	09/08/13 1:00 PM 09/08/13 11:33 AM	1587.189 gpm 1453.397 gpm	1142776 gal 920000 gal	3.507 AF 2.8234 AF	<input type="checkbox"/> <input type="checkbox"/>
37	Complete	3267	Request Delivery	09/08/13 1:00 AM 09/08/13 1:00 AM	09/08/13 1:00 PM 09/08/13 1:10 PM	648.873 gpm 631.507 gpm	467189 gal 461000 gal	1.4337 AF 1.4148 AF	<input type="checkbox"/> <input type="checkbox"/>
54	Complete	3304	Request Delivery	09/08/13 6:00 AM 09/08/13 6:01 AM	09/08/13 6:00 PM 09/08/13 6:02 PM	1046.589 gpm 1065.187 gpm	753544 gal 768000 gal	2.3125 AF 2.3569 AF	<input type="checkbox"/> <input type="checkbox"/>
55	Complete	3246	Request Delivery	09/07/13 8:00 AM 09/07/13 8:01 AM	09/07/13 6:00 PM 09/07/13 6:01 PM	258.333 gpm 258.333 gpm	155000 gal 155000 gal	0.4757 AF 0.4757 AF	<input type="checkbox"/> <input type="checkbox"/>
59	Complete	3282	Request Delivery	09/07/13 7:00 AM 09/07/13 7:01 AM	09/08/13 3:00 PM 09/08/13 3:06 PM	846.189 gpm 798.442 gpm	1624684 gal 1537000 gal	4.986 AF 4.7169 AF	<input type="checkbox"/> <input type="checkbox"/>
69	Complete	3321	Request Delivery	09/08/13 5:00 PM 09/08/13 5:00 PM	09/09/13 5:00 AM 09/09/13 5:02 AM	454.357 gpm 458.449 gpm	327137 gal 331000 gal	1.0039 AF 1.0158 AF	<input type="checkbox"/> <input type="checkbox"/>
70	Complete	3315	Request Delivery	09/08/13 8:00 AM 09/08/13 8:01 AM	09/09/13 8:00 AM 09/09/13 8:02 AM	797.503 gpm 297.016 gpm	1148405 gal 428000 gal	3.5243 AF 1.3135 AF	<input type="checkbox"/> <input type="checkbox"/>
73	Complete	3283	Request Delivery	09/07/13 7:00 AM 09/07/13 7:00 AM	09/08/13 1:00 PM 09/08/13 1:09 PM	990.664 gpm 1000.553 gpm	1783195 gal 1810000 gal	5.4724 AF 5.5547 AF	<input type="checkbox"/> <input type="checkbox"/>
76	Partial	3224	Request Delivery	09/08/13 7:00 AM 09/08/13 7:11 AM	09/08/13 10:00 AM 09/08/13 10:02 AM	152.51 gpm 175.439 gpm	27452 gal 30000 gal	0.0842 AF 0.0921 AF	<input type="checkbox"/> <input type="checkbox"/>
84	Unknown	0	Delivery	09/07/13 6:00 AM	09/09/13 7:24 AM	539.136 gpm	1598000 gal	4.9041 AF	<input type="checkbox"/>
101	Complete	3320	Request Delivery	09/08/13 6:00 PM 09/08/13 6:00 PM	09/09/13 9:00 AM 09/09/13 9:05 AM	469.027 gpm 467.403 gpm	422124 gal 423000 gal	1.2954 AF 1.2981 AF	<input type="checkbox"/> <input type="checkbox"/>

Delete

Export to Excel

Key Project Realized Benefits

30/30/30

- Water conservation (30% savings)
- Improved yields (30%)
- Reduced energy use (greater than 30%)
- Reduced groundwater pumping

Key Project Realized Benefits

Local, Regional, and State-Wide Benefits

Crop Yield Increase (30%)	Water Conservation (30%)	Energy Use Reduction (30%)
Improved Delivery Measurement (SBX7- 7)	Reduced Groundwater Pumping	Reduced Farm Runoff
Reduced Production Inputs	Crop Quality	Improved Level of Service
Reduced Farm Labor Costs	Improved Air Quality	Increased Land Values
Reduced On-Farm pumping	Drought Resiliency	Improved Water Quality
Improved Groundwater Quality	Replacement of Aging Infrastructure	Improved District Operations

Key Project Realized Benefits

Awards and Media Attention

International Commission on Irrigation and Drainage's WATSAVE Technology Award

American Council of Engineering Companies – National Grand Award

American Council of Engineering Companies – California Engineering Excellence Honor Award

American City and County Crown Communities Sustainability Award

Articles in Public Works Magazine, American City and County, Engineering News Record, Sacramento Business Journal, Water Environment and Technology.

District has given over 25 tours to groups of State and Federal officials, irrigation districts, and professional organizations.



Stantec

Questions and Comments?

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Jeff.shaw@stantec.com
916-524-3405